FIG. 1

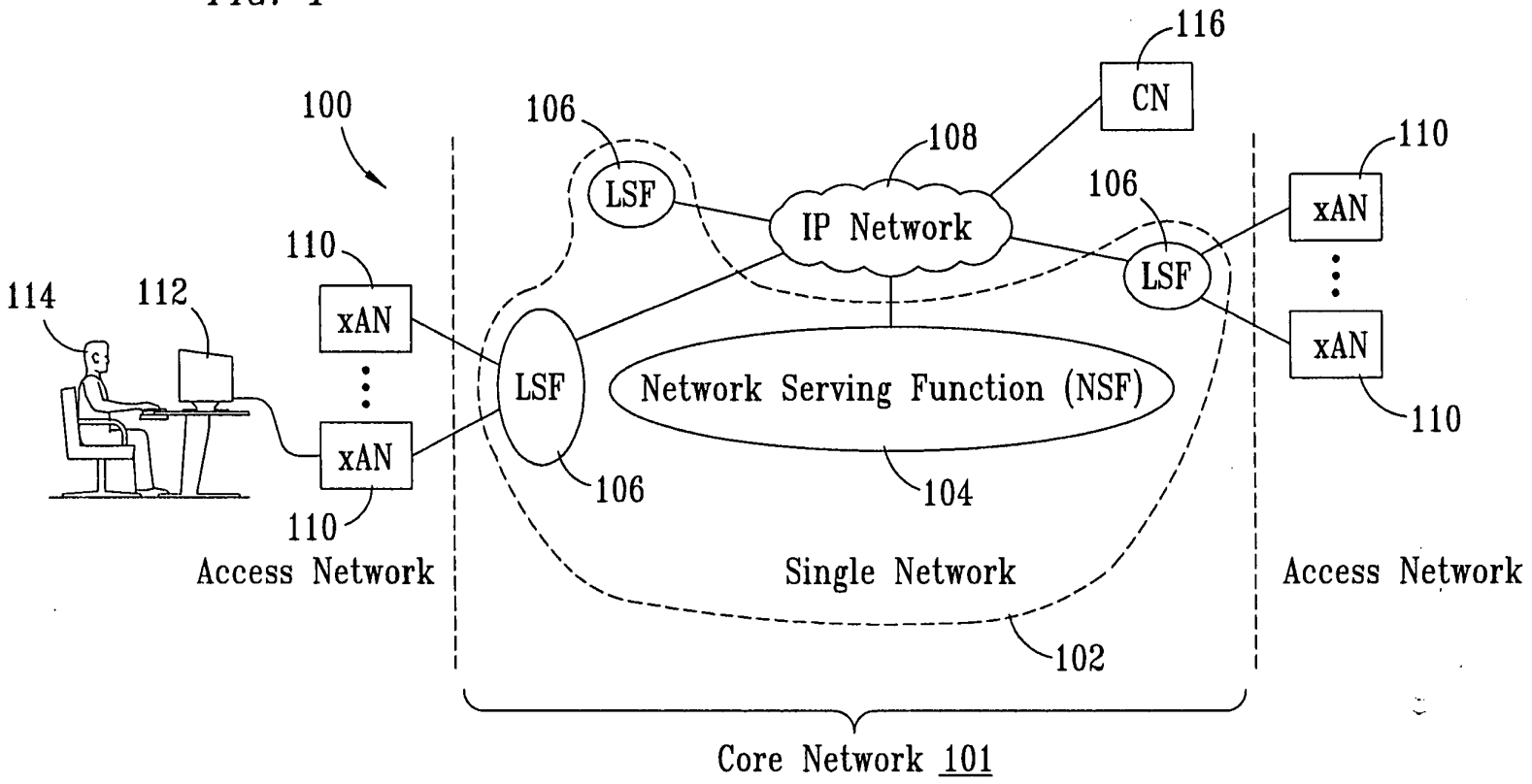


FIG. 2

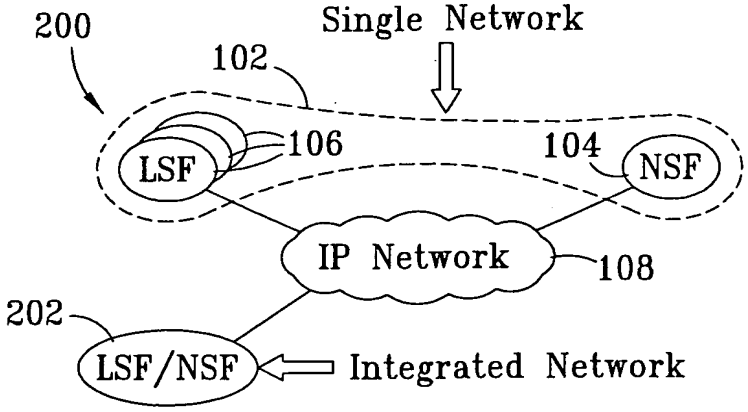

200
Single Network
102
106
LSF
104
NSF
IP Network
108
202
LSF/NSF
Integrated Network

FIG. 3

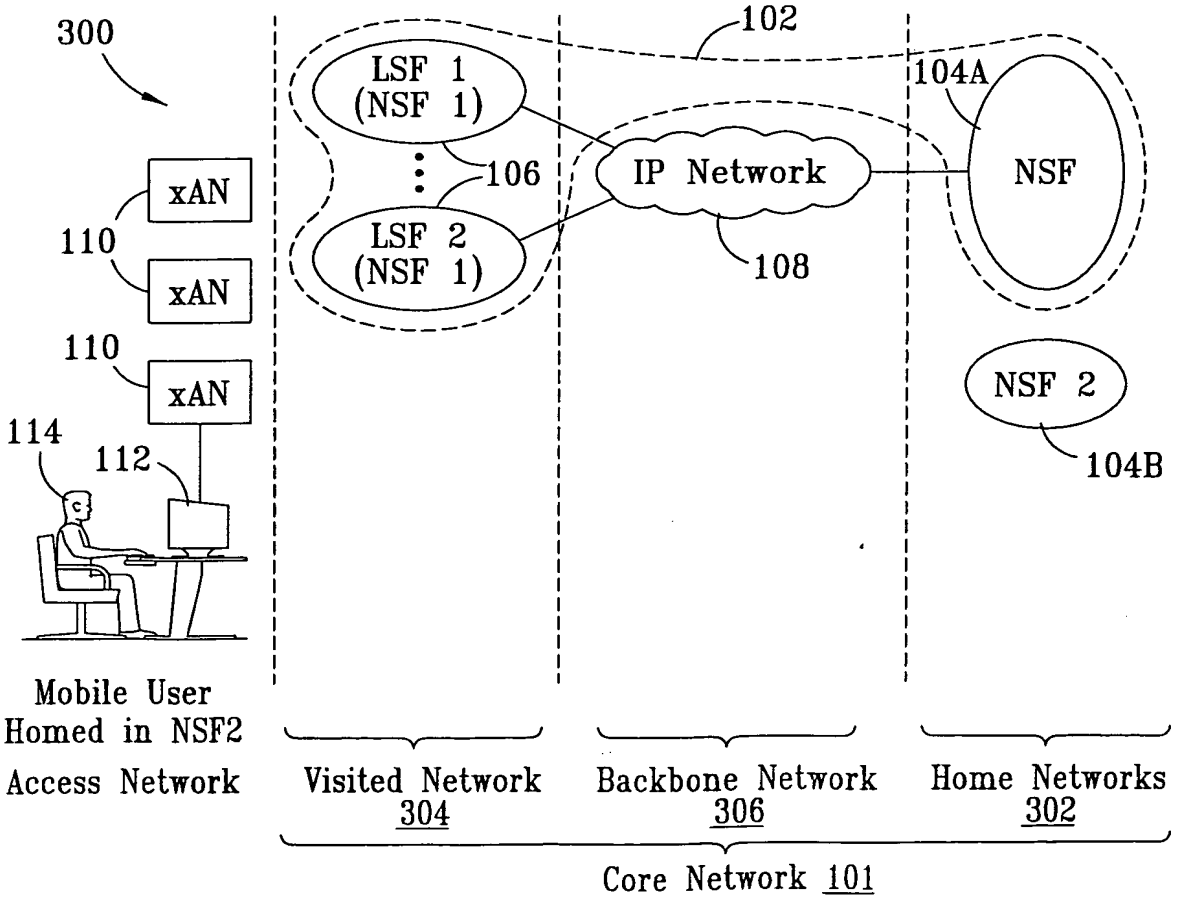

300
102
LSF 1
(NSF 1)
106
LSF 2
(NSF 1)
IP Network
108
104A
NSF
NSF 2
104B
xAN
110
xAN
110
xAN
114
112
Mobile User
Homed in NSF2
Access Network
Visited Network
304
Backbone Network
306
Home Networks
302
Core Network 101

FIG. 4A

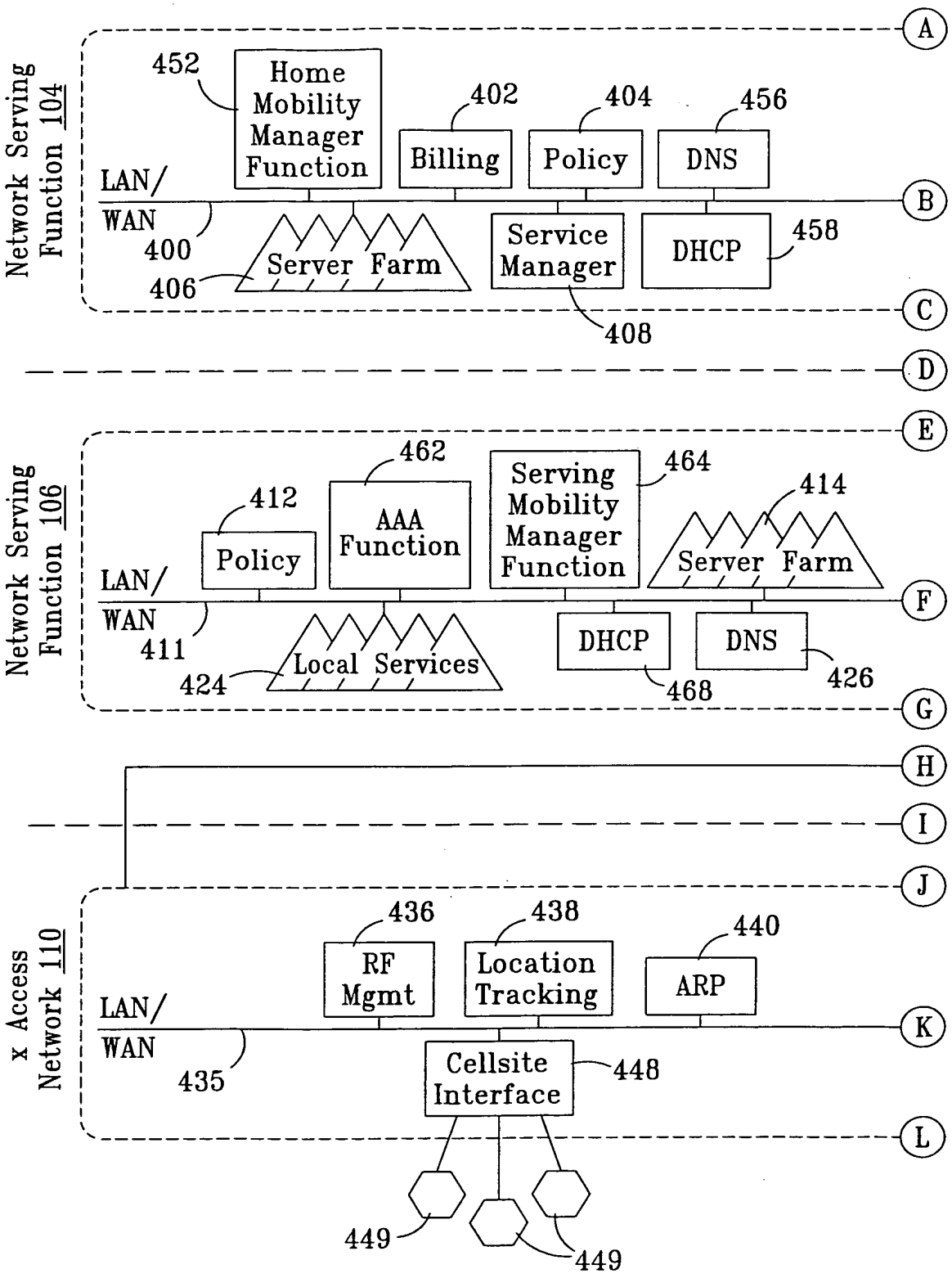

A
452
Home Mobility Manager Function
402
Billing
404
Policy
456
DNS
Network Serving Function 104
LAN/ WAN
400
B
Server Farm
406
Service Manager
DHCP
458
C
408
D
E
462
AAA Function
412
Policy
Serving Mobility Manager Function
464
414
Server Farm
Network Serving Function 106
LAN/ WAN
411
F
Local Services
424
DHCP
DNS
426
468
G
H
I
J
436
RF Mgmt
438
Location Tracking
440
ARP
x Access Network 110
LAN/ WAN
435
K
Cellsite Interface
448
L
449
449

FIG. 4B

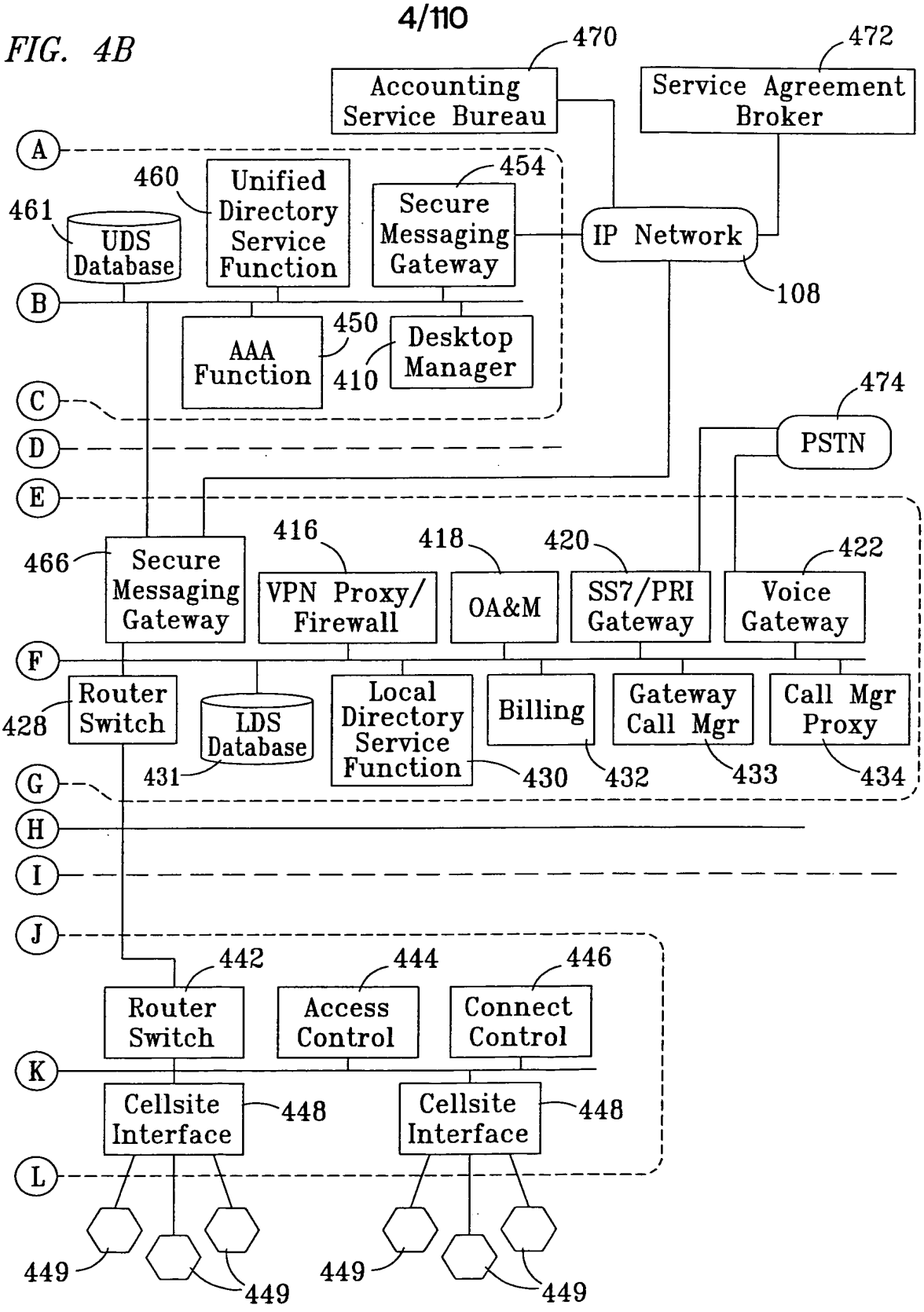

Accounting Service Bureau
470
Service Agreement Broker
472
A
460
Unified Directory Service Function
454
Secure Messaging Gateway
461
UDS Database
IP Network
108
B
AAA Function
450
Desktop Manager
410
C
474
PSTN
D
E
466
Secure Messaging Gateway
416
VPN Proxy/ Firewall
418
OA&M
420
SS7/PRI Gateway
422
Voice Gateway
F
428
Router Switch
LDS Database
431
Local Directory Service Function
430
Billing
432
Gateway Call Mgr
433
Call Mgr Proxy
434
G
H
I
J
442
Router Switch
444
Access Control
446
Connect Control
K
Cellsite Interface
448
Cellsite Interface
448
L
449
449
449
449

FIG. 4C

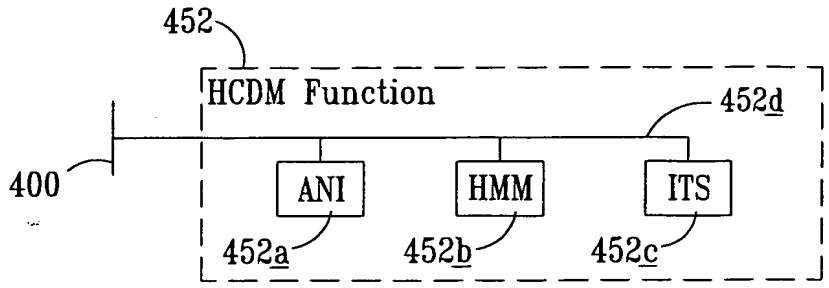


FIG. 4D

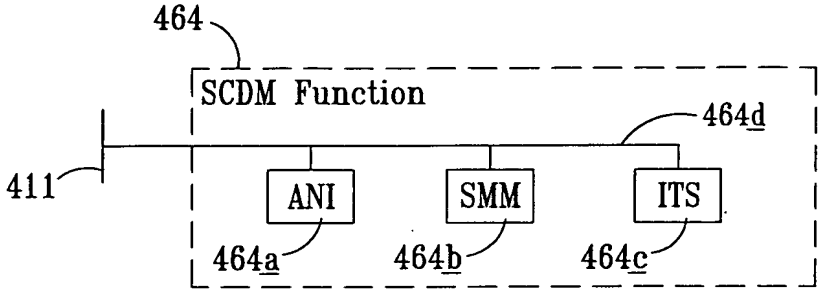


FIG. 4E

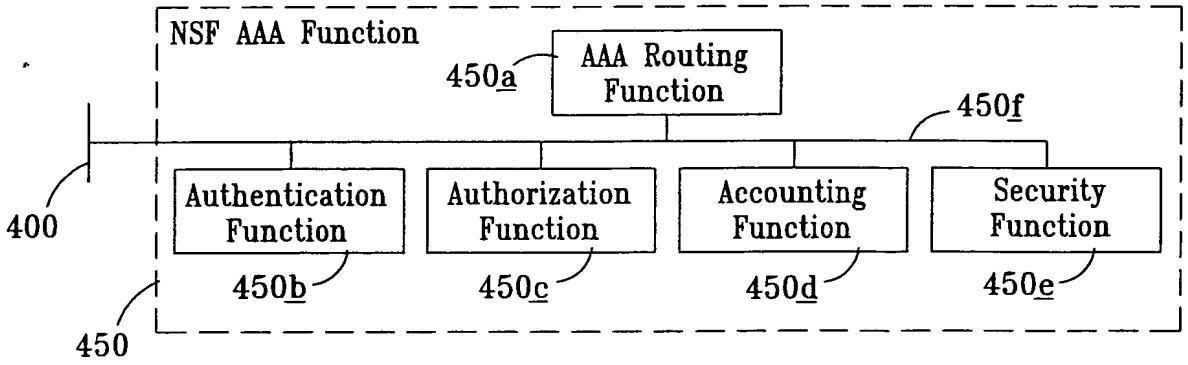
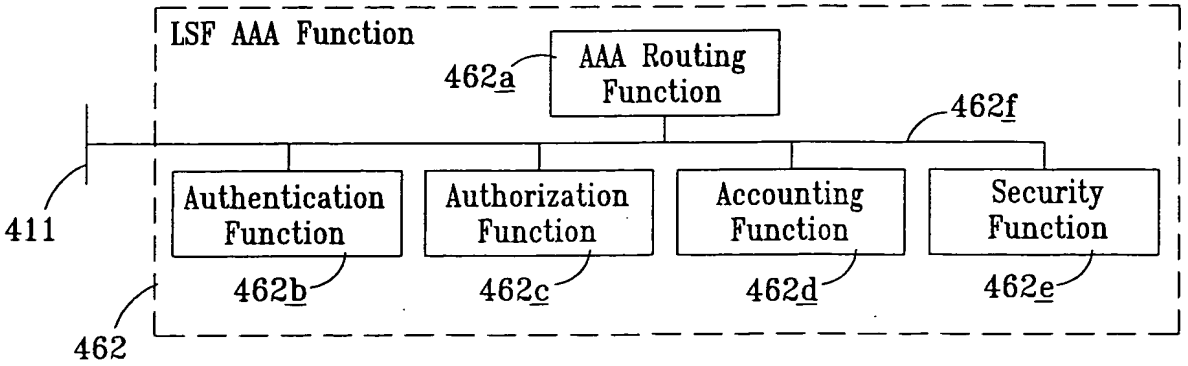


FIG. 4F



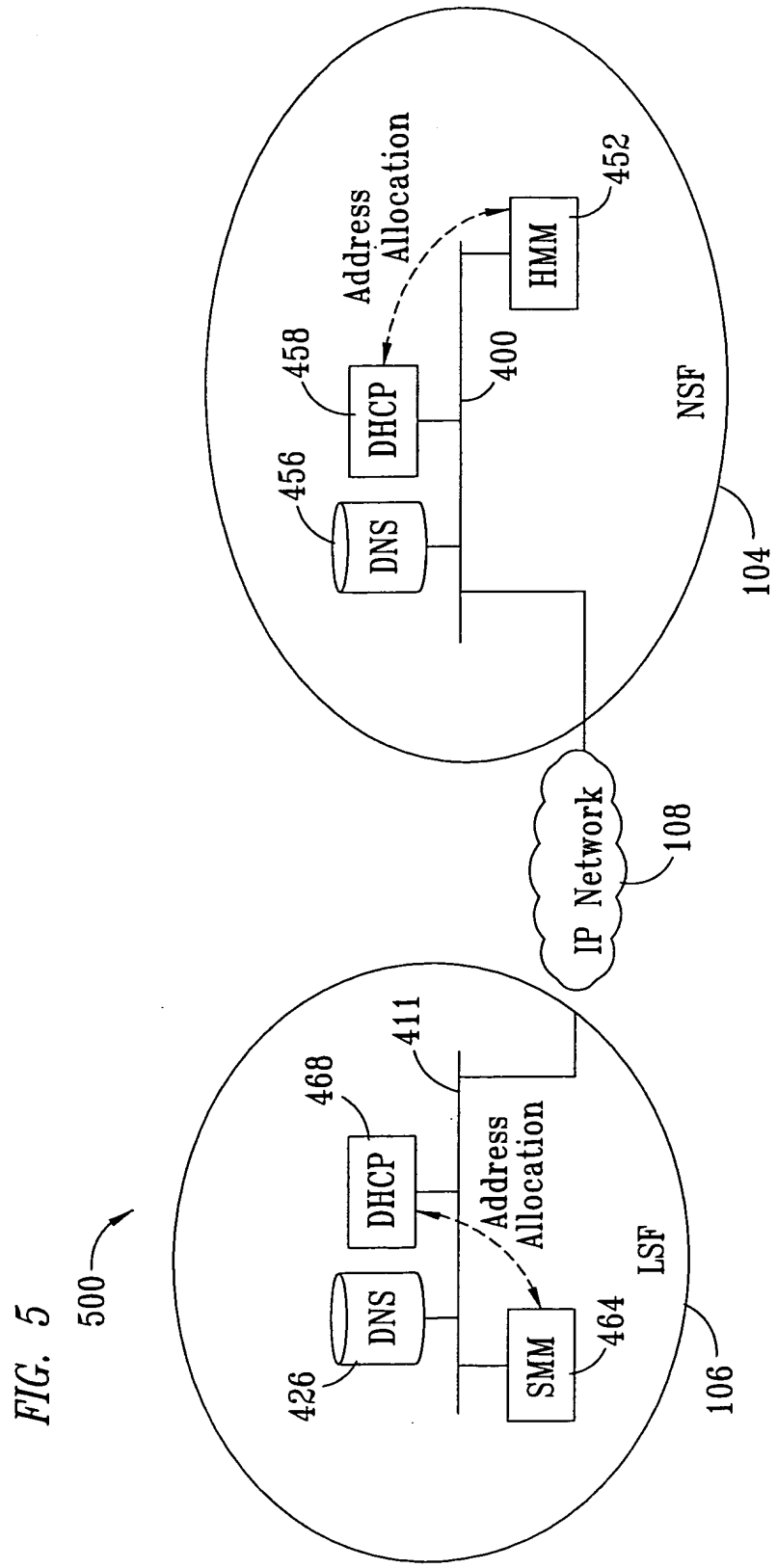

500
NSF
104
LSF
106
IP Network
108
DHCP
458
DNS
456
HMM
452
400
Address Allocation
DHCP
468
DNS
426
SMM
464
411
Address Allocation

FIG. 5

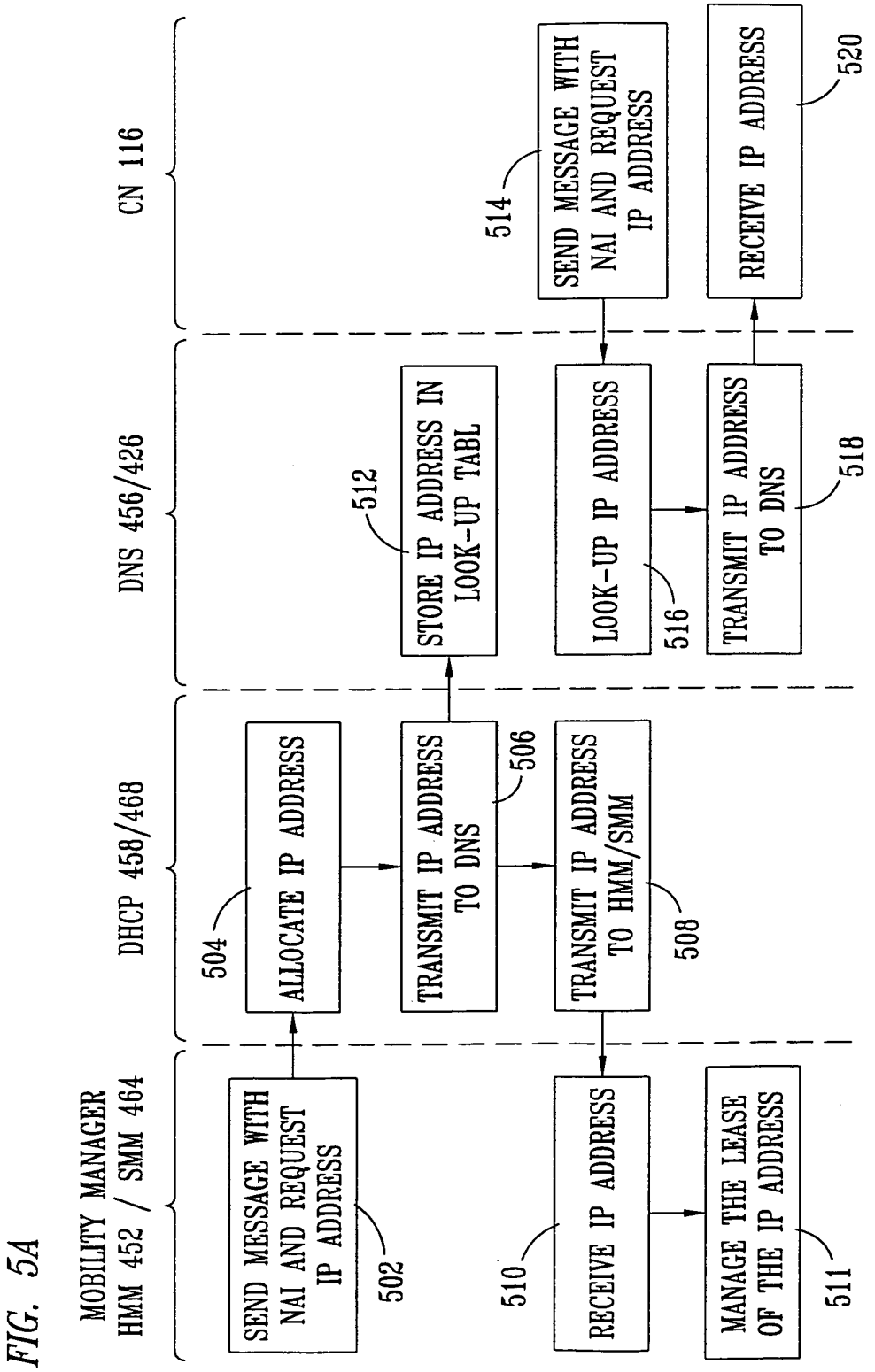

MOBILITY MANAGER
HMM 452 / SMM 464
DHCP 458/468
DNS 456/426
CN 116
SEND MESSAGE WITH NAI AND REQUEST IP ADDRESS
502
ALLOCATE IP ADDRESS
504
TRANSMIT IP ADDRESS TO DNS
506
TRANSMIT IP ADDRESS TO HMM/SMM
508
RECEIVE IP ADDRESS
510
MANAGE THE LEASE OF THE IP ADDRESS
511
STORE IP ADDRESS IN LOOK-UP TABL
512
LOOK-UP IP ADDRESS
516
TRANSMIT IP ADDRESS TO DNS
518
SEND MESSAGE WITH NAI AND REQUEST IP ADDRESS
514
RECEIVE IP ADDRESS
520

FIG. 5A

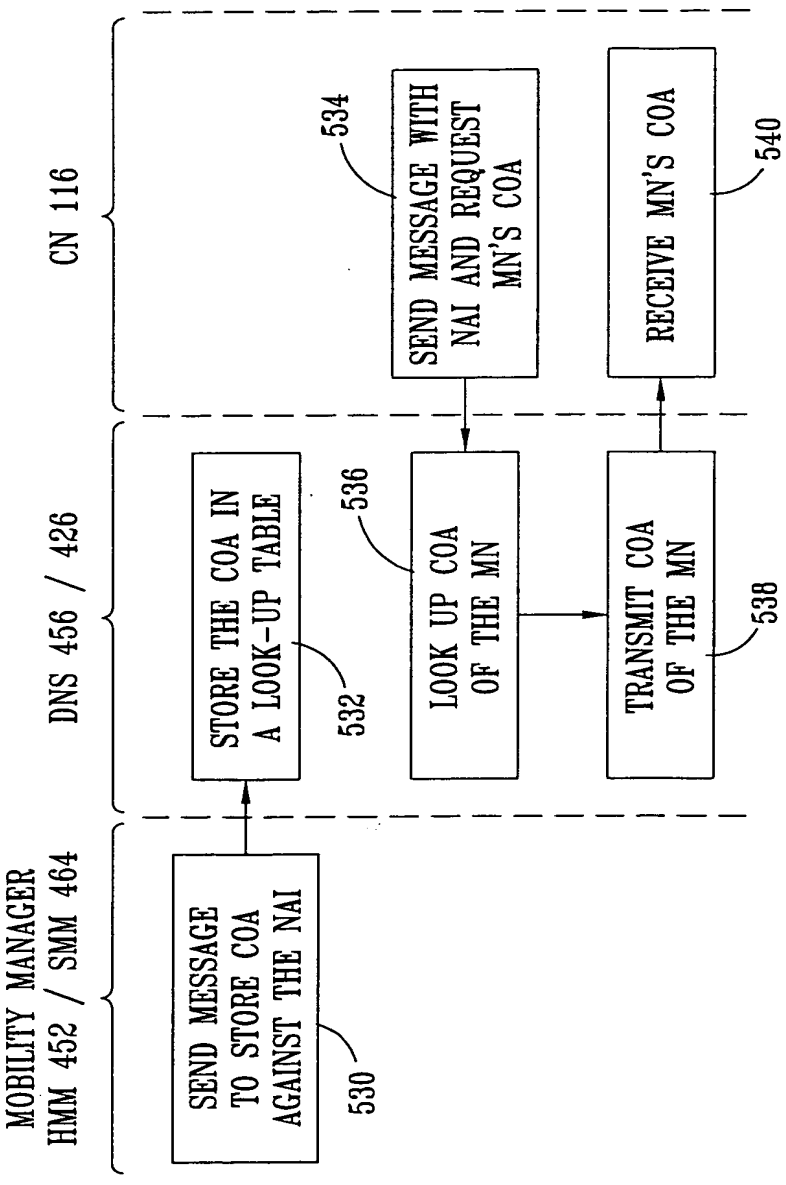

MOBILITY MANAGER
HMM 452 / SMM 464
DNS 456 / 426
CN 116
SEND MESSAGE TO STORE COA AGAINST THE NAI
530
STORE THE COA IN A LOOK-UP TABLE
532
536
LOOK UP COA OF THE MN
TRANSMIT COA OF THE MN
538
534
SEND MESSAGE WITH NAI AND REQUEST MN'S COA
RECEIVE MN'S COA
540

FIG. 5B

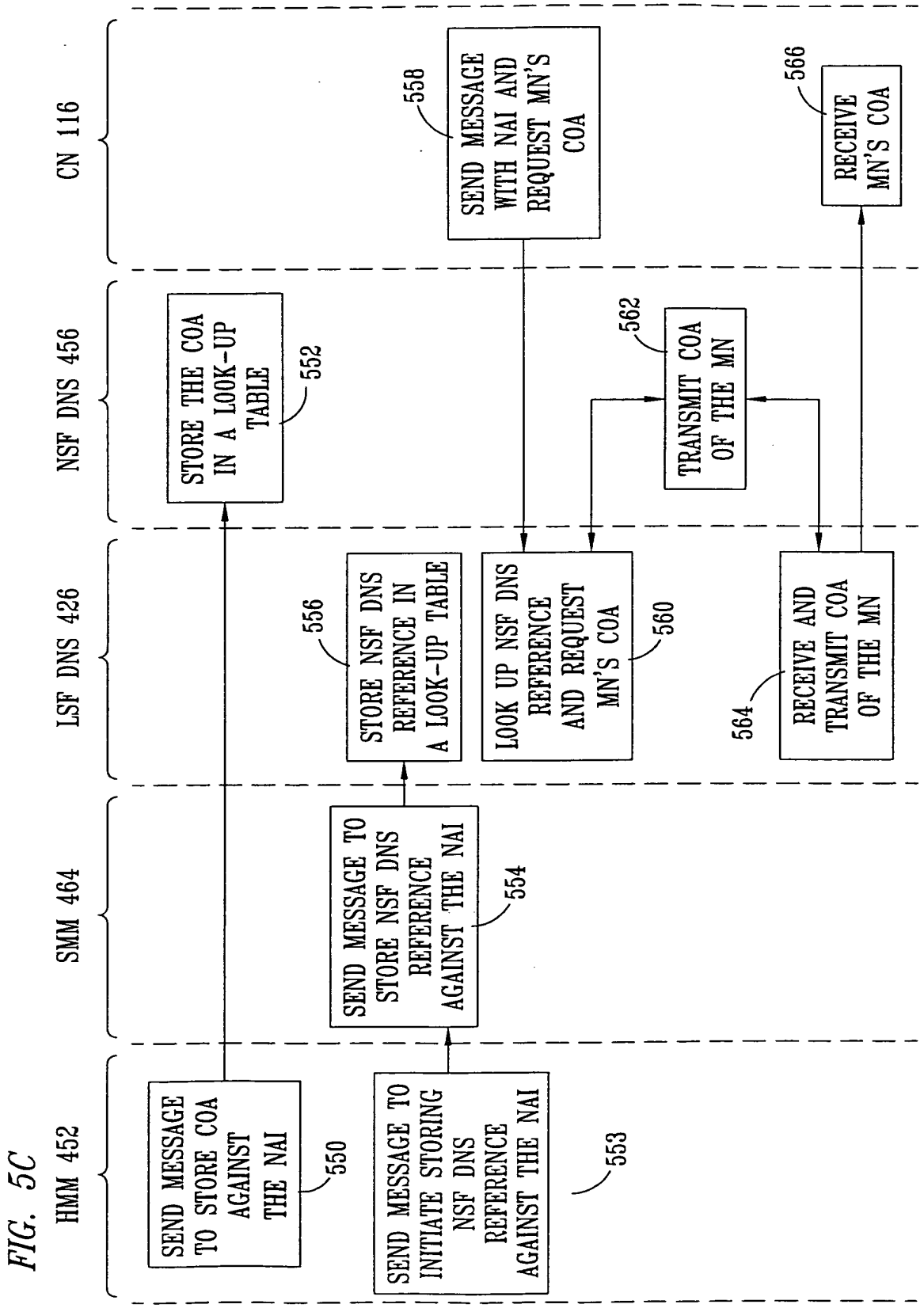

HMM 452
SMM 464
LSF DNS 426
NSF DNS 456
CN 116
SEND MESSAGE TO STORE COA AGAINST THE NAI
550
SEND MESSAGE TO INITIATE STORING NSF DNS REFERENCE AGAINST THE NAI
553
SEND MESSAGE TO STORE NSF DNS REFERENCE AGAINST THE NAI
554
STORE NSF DNS REFERENCE IN A LOOK-UP TABLE
556
STORE THE COA IN A LOOK-UP TABLE
552
SEND MESSAGE WITH NAI AND REQUEST MN'S COA
558
LOOK UP NSF DNS REFERENCE AND REQUEST MN'S COA
560
TRANSMIT COA OF THE MN
562
RECEIVE AND TRANSMIT COA OF THE MN
564
RECEIVE MN'S COA
566

FIG. 5C

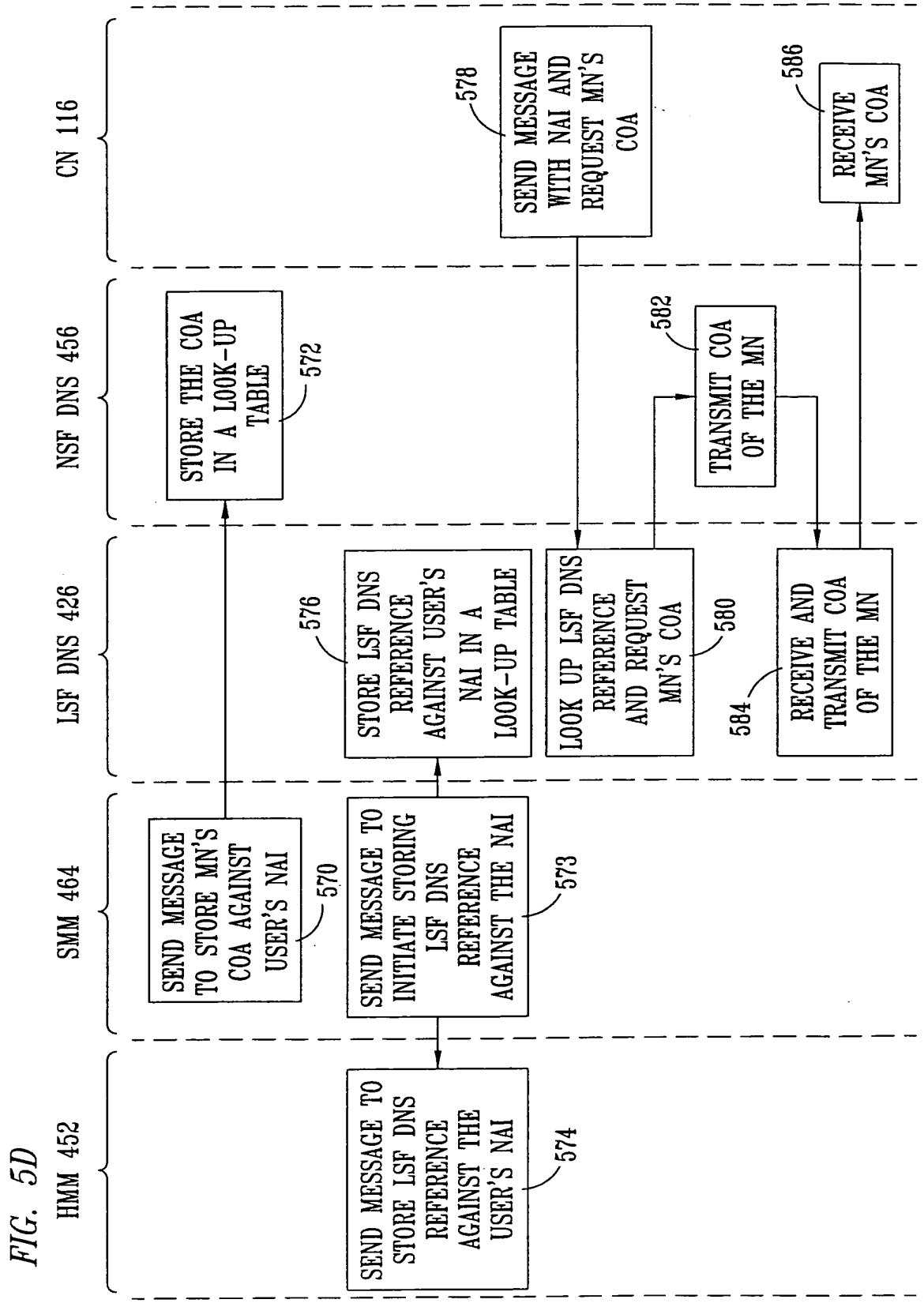
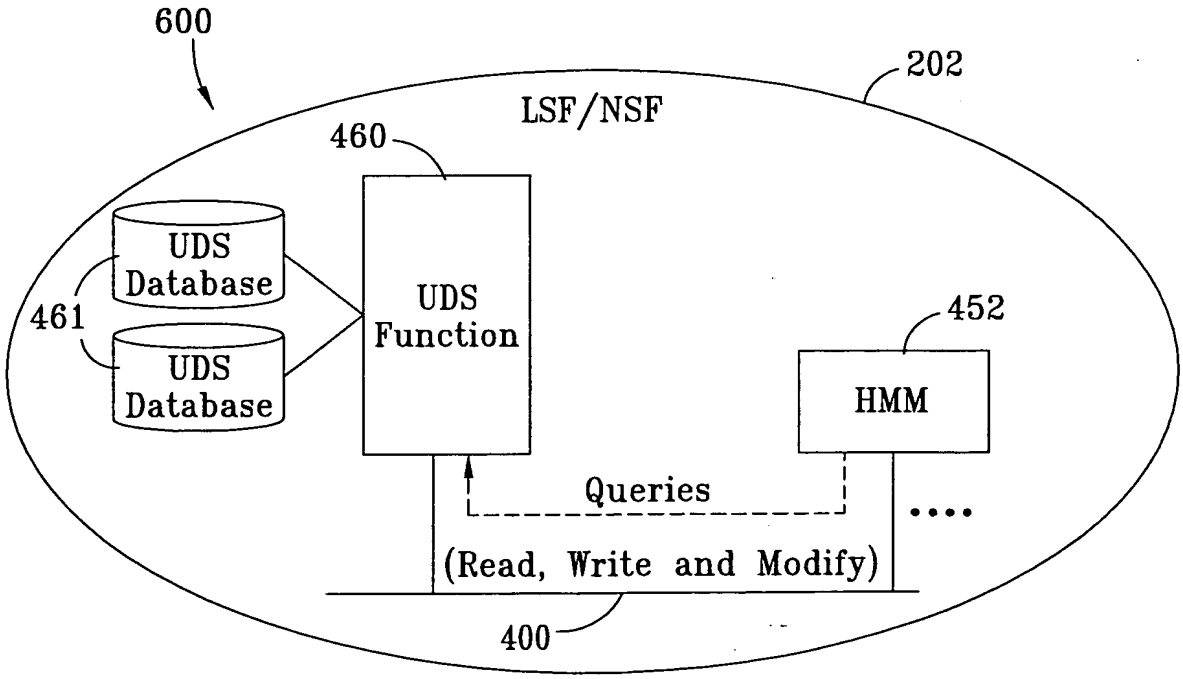

HMM 452
SMM 464
LSF DNS 426
NSF DNS 456
CN 116
SEND MESSAGE TO STORE LSF DNS REFERENCE AGAINST THE USER'S NAI
574
SEND MESSAGE TO INITIATE STORING LSF DNS REFERENCE AGAINST THE NAI
573
SEND MESSAGE TO STORE MN'S COA AGAINST USER'S NAI
570
STORE LSF DNS REFERENCE AGAINST USER'S NAI IN A LOOK-UP TABLE
576
STORE THE COA IN A LOOK-UP TABLE
572
LOOK UP LSF DNS REFERENCE AND REQUEST MN'S COA
580
TRANSMIT COA OF THE MN
582
SEND MESSAGE WITH NAI AND REQUEST MN'S COA
578
RECEIVE AND TRANSMIT COA OF THE MN
584
RECEIVE MN'S COA
586

FIG. 5D

FIG. 6


600
202
LSF/NSF
460
UDS Database
461
UDS Database
UDS Function
452
HMM
Queries
(Read, Write and Modify)
400

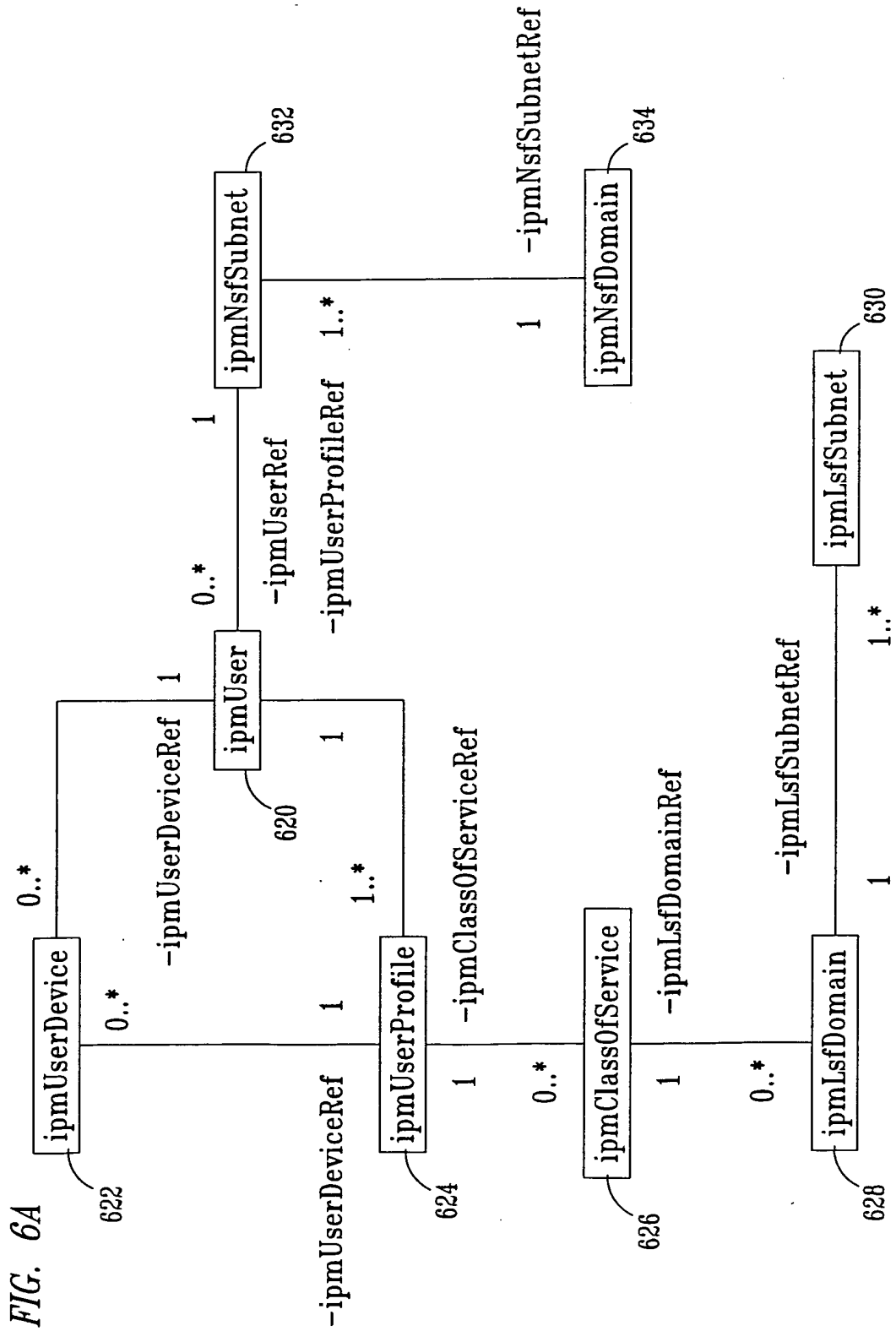

ipmUserDevice
622
ipmUser
620
ipmUserProfile
624
ipmClassOfService
626
ipmLsfDomain
628
ipmLsfSubnet
630
ipmNsfSubnet
632
ipmNsfDomain
634
-ipmUserDeviceRef
-ipmUserRef
-ipmUserProfileRef
-ipmClassOfServiceRef
-ipmLsfDomainRef
-ipmLsfSubnetRef
-ipmNsfSubnetRef
0..*
1..*
1

FIG. 6A

FIG. 6B(a)

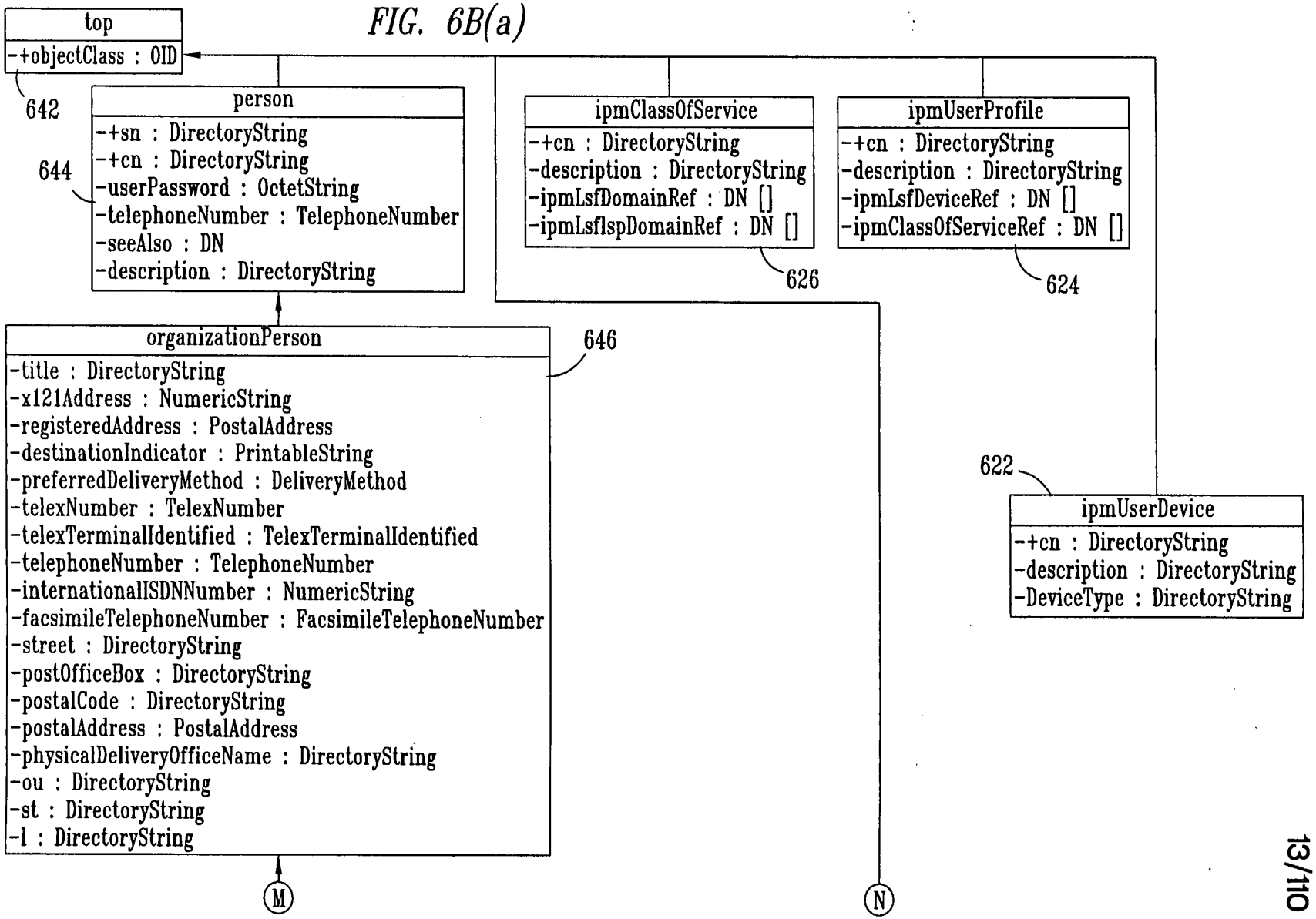


FIG. 6B(b)

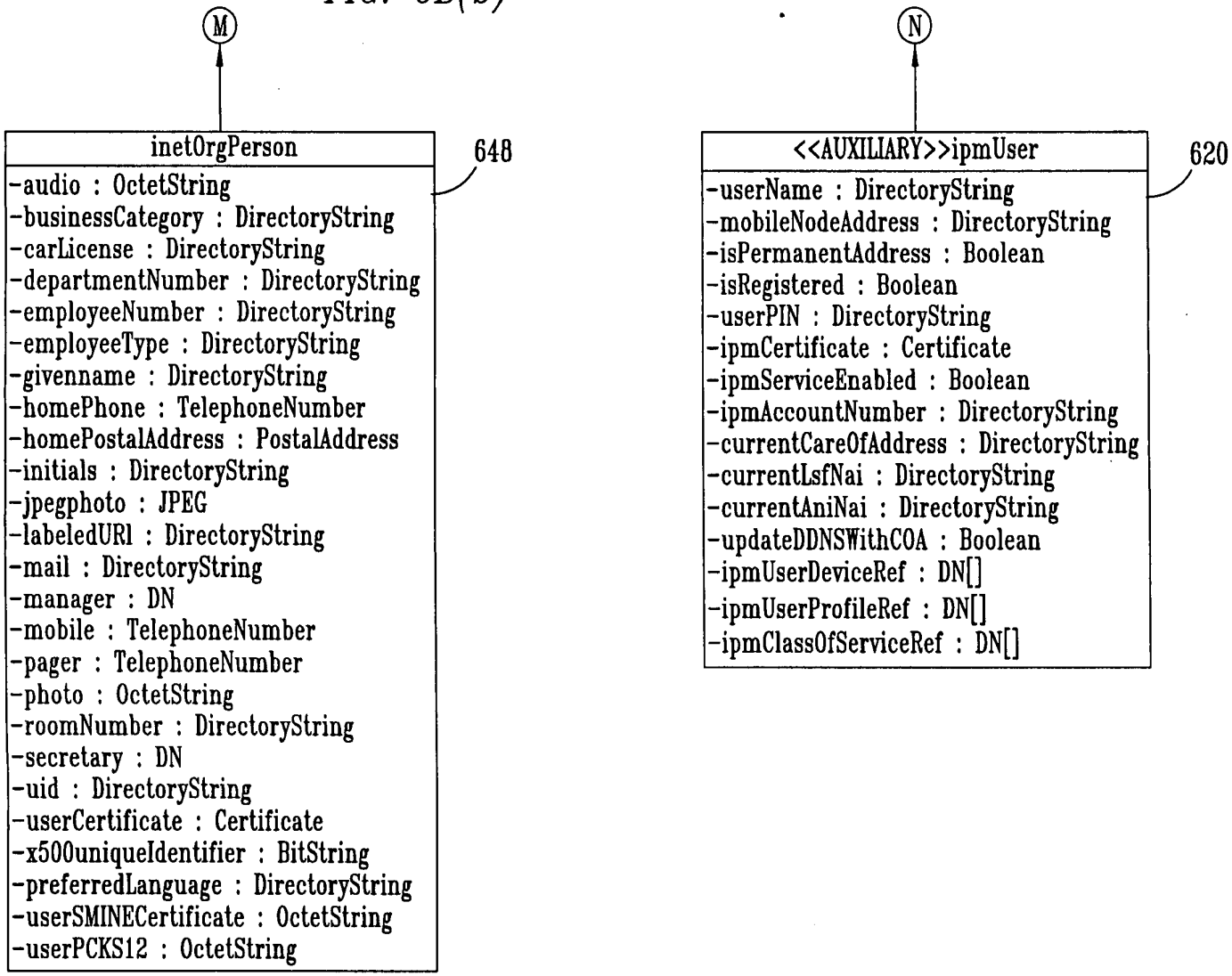


FIG. 6C

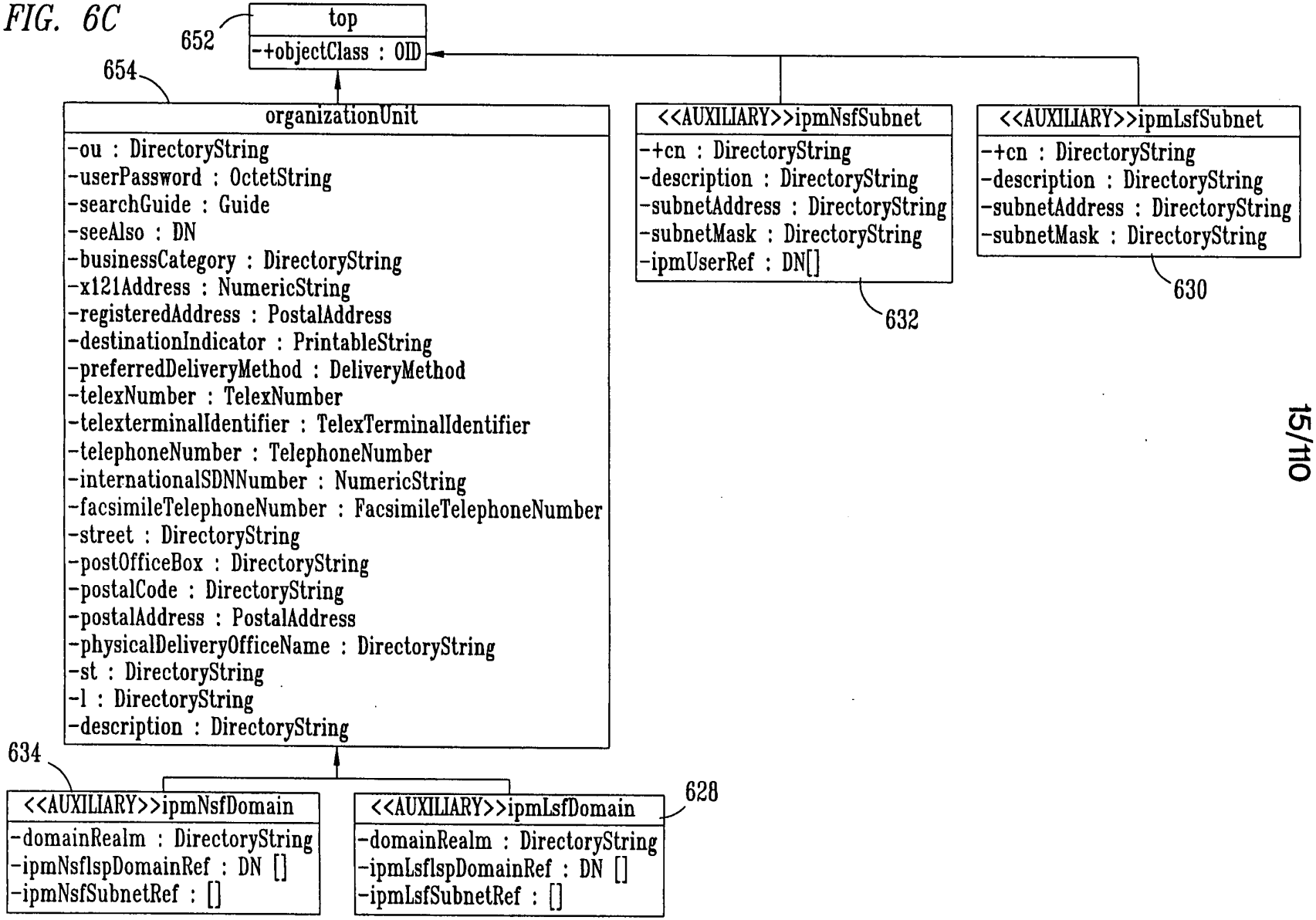


FIG. 6D

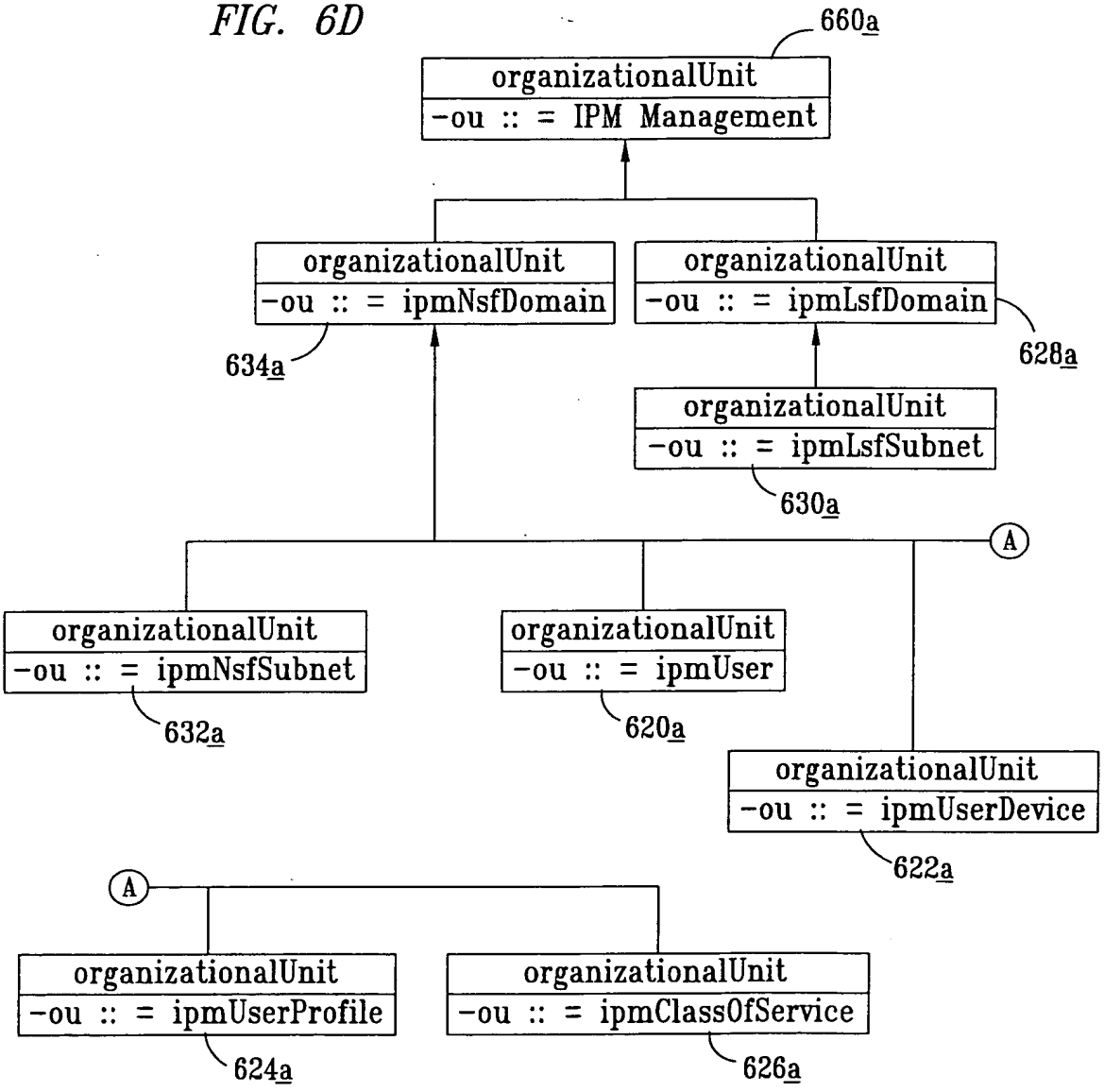

660a
organizationalUnit
-ou :: = IPM Management
organizationalUnit
-ou :: = ipmNsfDomain
634a
organizationalUnit
-ou :: = ipmLsfDomain
628a
organizationalUnit
-ou :: = ipmLsfSubnet
630a
A
organizationalUnit
-ou :: = ipmNsfSubnet
632a
organizationalUnit
-ou :: = ipmUser
620a
organizationalUnit
-ou :: = ipmUserDevice
622a
A
organizationalUnit
-ou :: = ipmUserProfile
624a
organizationalUnit
-ou :: = ipmClassOfService
626a

FIG. 6E(a)

Name	Type	MatchingRule	Multi-Valued	Purpose	Example
userName	Directory String	CaseIgnoreString	No	The name of the User (subscriber)	johndoe
MobileNodeAddress	Directory String	CaseIgnoreString	No	Mobile Node's home IP address	100.150.128.1
IsAddressPermanent	Booleam	CaseIgnoreString	No	Flag signifying whether the Mobile Node's home IP address was permanently provisioned or allocated (e.g. by DHCP)	FALSE
IsRegistered	Boolean	CaseIgnoreString	No	Flag signifying whether the Mobile Node is presently registered	TRUE
currentLsfNai	Directory String	CaseIgnoreString	No	NAI of the LSF at which the Mobile Node is registered	smm1@southwesternbell.com
currentAniNai	Directory String	Integer	No	4 byte code identifying the Mobile Node's routing area (i.e. as is GPRS routing area)	95

(P)

FIG. 6E(b)

P

currentCareOfAddress	Certificate	CaseIgnoreString	No	IP Care of Address for the roaming Mobile Node	240.240.10.66
ipmAccountNumber	Directory String	CaseIgnoreString	No	User's account number assigned by the IPM security center	12345678
ipmCertificate	Certificate	CaseIgnoreString	No	User's Certificate generated by IPM Security Center	
userPIN	Directory String	CaseIgnoreString	No	User PIN number. It is an integer selected by the user to secure the access to his account	123decx456
ipmUserProfileRef	DN	DN	Yes	The reference for the user profile objectclass	DN: "uid=JohnJoe, ou=ipmUserProfile, ou=ipm Management, o=nortelnetworks"
ipmClassOfServiceRef	DN	DN	Yes	The reference for the user class of service objectclass	DN: "uid=JohnJoe, ou=ipmClassOfService, iu=ipm Management, o=nortelnetworks"

Q

FIG. 6E(c)

Q

ipmUserDeviceRef	DN	DN	Yes	The reference for the user device objectclass	DN: "uid=JohnJoe, ou=ipmUserDevice, ou=ipm Management, o=nortelnetworks"
UpdateDDNSWithCOA	Directory String	DN	No	Update the DNS with the COA	TRUE
IPMServiceEnabled	Boolean	CaseIgnoreString	No	Flag signifying whether the IPM service is enabled	FALSE
Key Inherited attributes:					
objectclass		CaseIgnoreString	Yes	Schema objectclass that define mandatory and optional attributes	ipmUser
cn		CaseIgnoreString	Yes	Common Name is the same as the naiUser for the phase I prototype	johndoe@nortelnetworks.com
sn		CaseIgnoreString	No	Surname (i.e. last name)	Doe
c		CaseIgnoreString	No	ISO 3166 County Code, optional	US

R

FIG. 6E(d)

l		CaseIgnoreString	No	Locality(i,e. city or region), this is for user's address, optional	Dallas
st		CaseIgnoreString	No	State or Province, optional	Texas
street		CaseIgnoreString	No	Street address, optional	2201 Lakeside Blvd
apt		Integer	No	Apartment number	2061
homePhoneNumber		CaseIgnoreString	No	User's home phone number	972-492-1777
password		CaseIgnoreString	No	User's password	Ue998cd567

FIG. 6F

Name	Type	MatchingRule	Multi-Valued	Purpose	Example
cn	Directory String	CaseIgnoreString	No	Common name for the ipmUserDevice	johndoe@nortelnetworks.com
description	Directory String	CaseIgnoreString	No	The description list the device vendor, device model, the device version...	e.g.(Qualcomm QCP-2700)
deviceType	Directory String	CaseIgnoreString	No	There are two device types, devices used by a mobile subscriber to access the network and devices that are logically the user, e.g. mobile routers	e.g.(notebook, mobile)

FIG. 6G

Name	Type	MatchingRule	Multi-Valued	Purpose	Example
cn	Directory String	CaseIgnoreString	No	The common name for the ipmUserProfile objectclass	bob@nortelworks.com
description	Directory String	CaseIgnoreString	No	List all the information about the ipmUserProfile objectclass	e.g.(home, office)
ipmUserDeviceRef	DN	CaseIgnoreString	No	The reference for ipmUserDevice	DN: "uid=JohnJoe, ou=ipmUserDevice, ou=ipm Management, o=nortelnetworks"
ipmClassOfServiceRef	DN	CaseIgnoreString	No	The reference for ipmClassOfService	DN: "uid=JohnJoe, ou=ipmClassOfService, ou=ipm Management, o=nortelnetworks"

FIG. 6H

Name	Type	MatchingRule	Multi-Valued	Purpose	Example
cn	Directory String	CaseIgnoreString	No	The common name for the ipmClassOfService	bob@nortelworks.com
description	Directory String	CaseIgnoreString	No		e.g.(gold)
ipmLsfDomainRef	DN	DN	Yes	The reference for ipmLsfDomain	DN: "cn=ipmLsfDomain, ou=ipm Management, o=nortelnetworks"

FIG. 6I

Name	Type	MatchingRule	Multi-Valued	Purpose	Example
domainRealm	Directory String	CaseIgnoreString	No	Realm component of the IETF Network Access Identifier for the home network	John.Doe@ISPabe.com
ipmNsfSubnetRef	DN	DN	Yes	The reference of the NSFsubnet	DN: "cn=ipmNsfSubnet, ou=ipm Management, o=nortelnetworks"

FIG. 6J

Name	Type	MatchingRule	Multi-Valued	Purpose	Example
cn	Directory String	CaseIgnoreString	No	The common name for the ipmClassOfService	ip10@nortelworks.com
description	Directory String	CaseIgnoreString	No	The description for the ipmLsfSubnet	
subnetMask	Directory String	CaseIgnoreString	No	32 bit value help the devices understand the limits or boundaries of the network and subnet	255.255.255.0
subnetAddress	Directory String	CaseIgnoreString	No	The IP address of the LSFsubnet	47.456.70.80

FIG. 6K

Name	Type	MatchingRule	Multi-Valued	Purpose	Example
cn	Directory String	CaseIgnoreString	No	The common name for the ipmClassOfService	ip10@nortelworks.com
description	Directory String	CaseIgnoreString	No	The description for the ipmNsfSubnet	
subnetMask	Directory String	CaseIgnoreString	No	32 bit value help the devices understand the limits or boundaries of the network and subnet	255.255.255.0
subnetAddress	Directory String	CaseIgnoreString	No	The IP address of the NSFsubnet	47.456.70.80

FIG. 6L

Name	Type	MatchingRule	Multi-Valued	Purpose	Example
domainRealm	Directory String	CaseIgnoreString	No	Realm component of the IETF Network Access Identifier for the home network	John.Doe@ISPabc.com
ipmLsfSubnetRef	DN	DN	Yes	The reference of the LSFsubnet	DN: "cn=ipmLsfSubnet, ou=ipm Management, o-nortelnetworks"

FIG. 6M

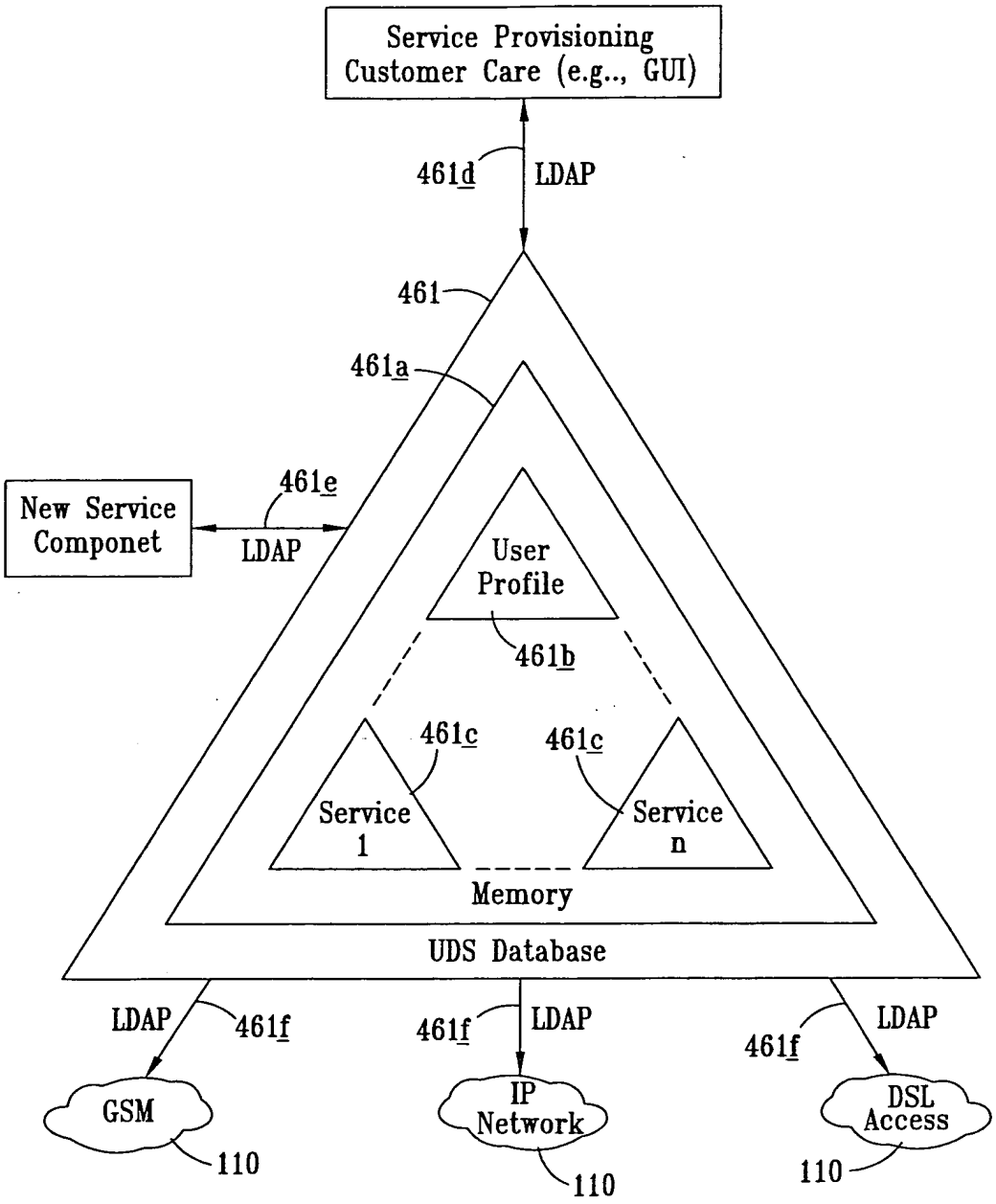

Service Provisioning
Customer Care (e.g.., GUI)
461d
LDAP
461
461a
New Service
Componet
461e
LDAP
User
Profile
461b
461c
461c
Service
1
Service
n
Memory
UDS Database
LDAP
461f
461f
LDAP
461f
LDAP
GSM
110
IP
Network
110
DSL
Access
110

FIG. 7

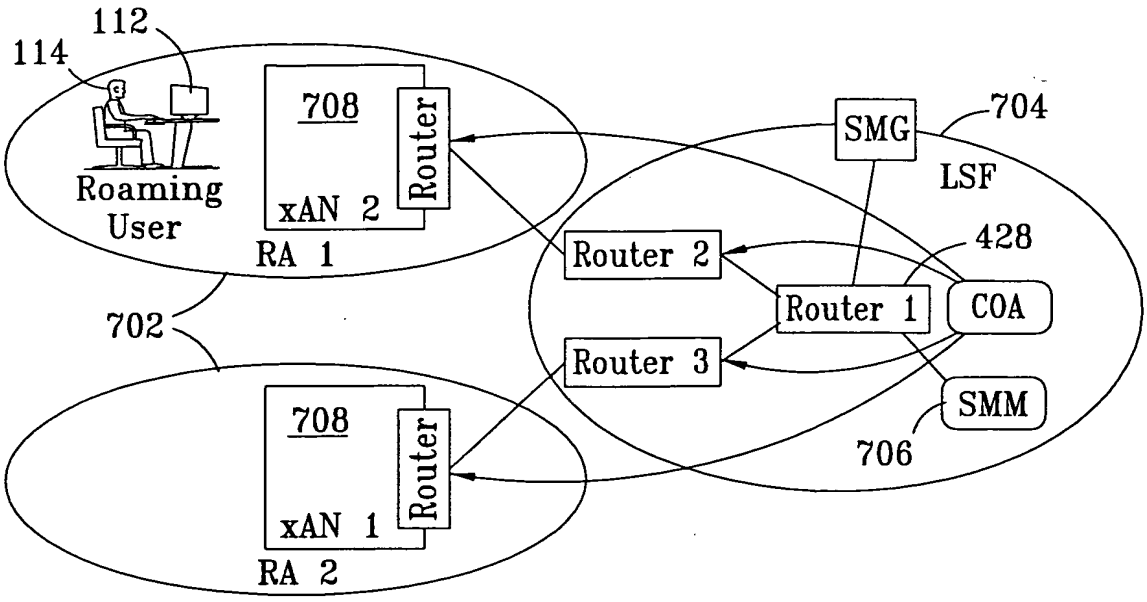

112
114
708
Router
Roaming User
xAN 2
RA 1
SMG
704
LSF
Router 2
428
Router 1
COA
Router 3
SMM
706
702
708
Router
xAN 1
RA 2

FIG. 8

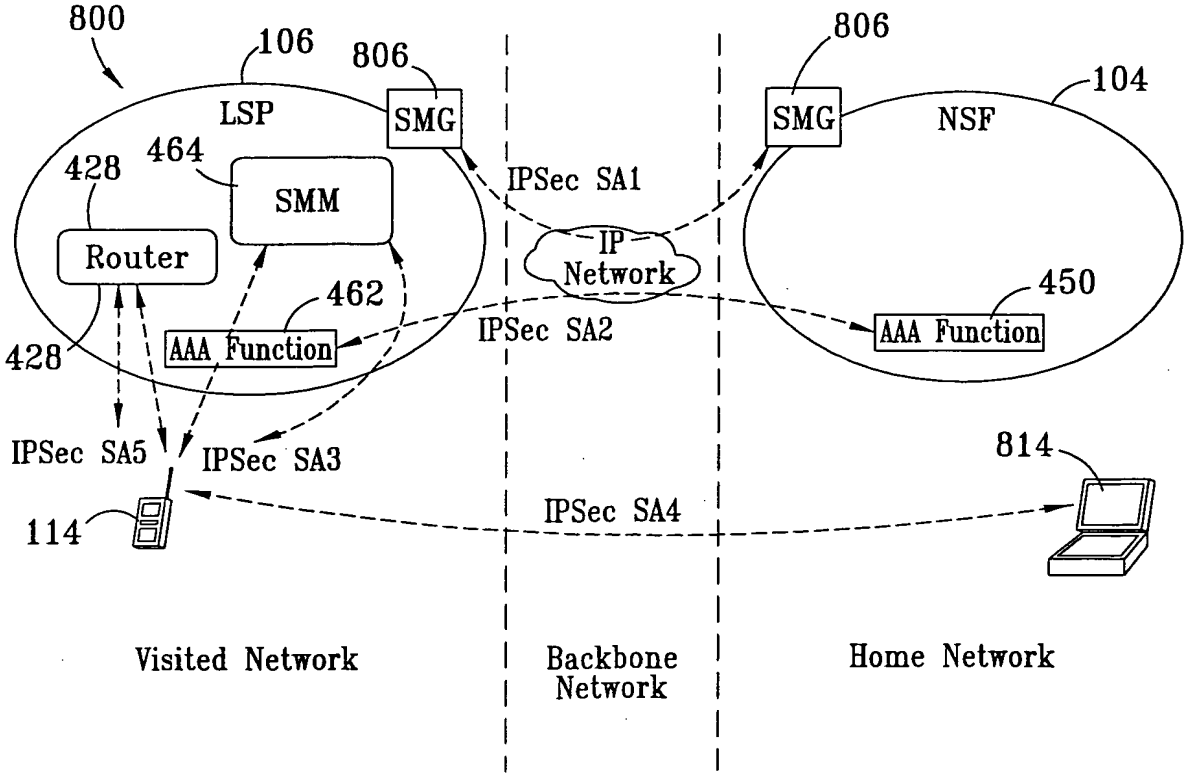

800
106
806
LSP
SMG
428
464
SMM
Router
462
AAA Function
428
IPSec SA1
IP Network
IPSec SA2
806
SMG
NSF
104
450
AAA Function
IPSec SA5
IPSec SA3
814
114
IPSec SA4
Visited Network
Backbone Network
Home Network

FIG. 9

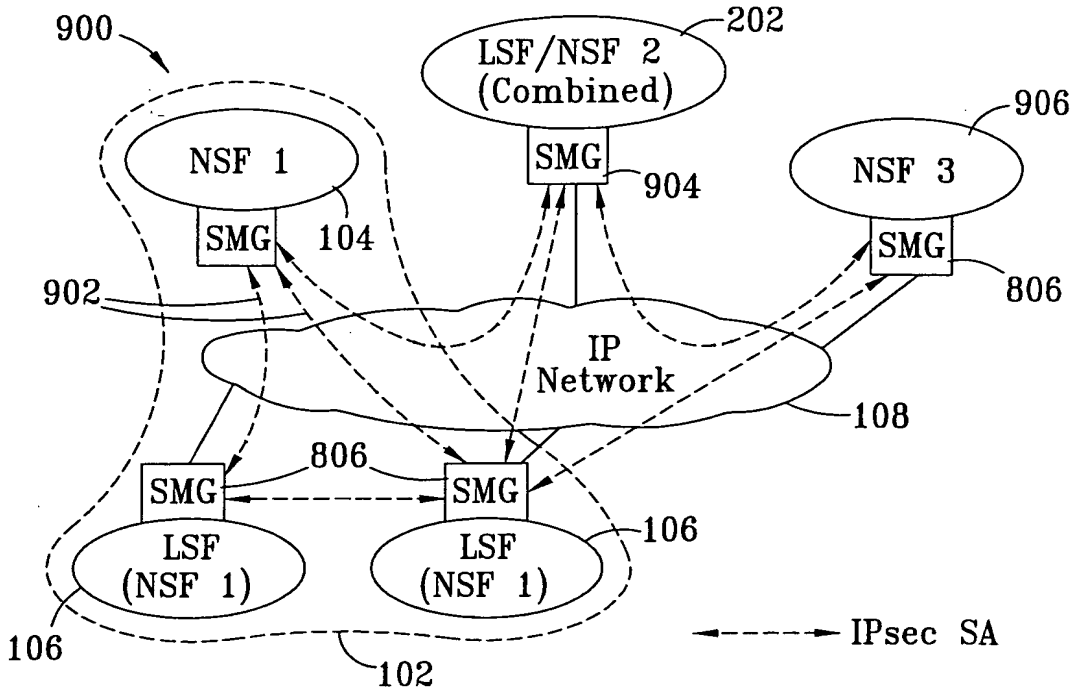

900
LSF/NSF 2
(Combined)
202
SMG
904
NSF 1
SMG
104
NSF 3
906
SMG
806
902
IP
Network
108
SMG
806
SMG
LSF
(NSF 1)
LSF
(NSF 1)
106
106
102
IPsec SA

FIG. 10

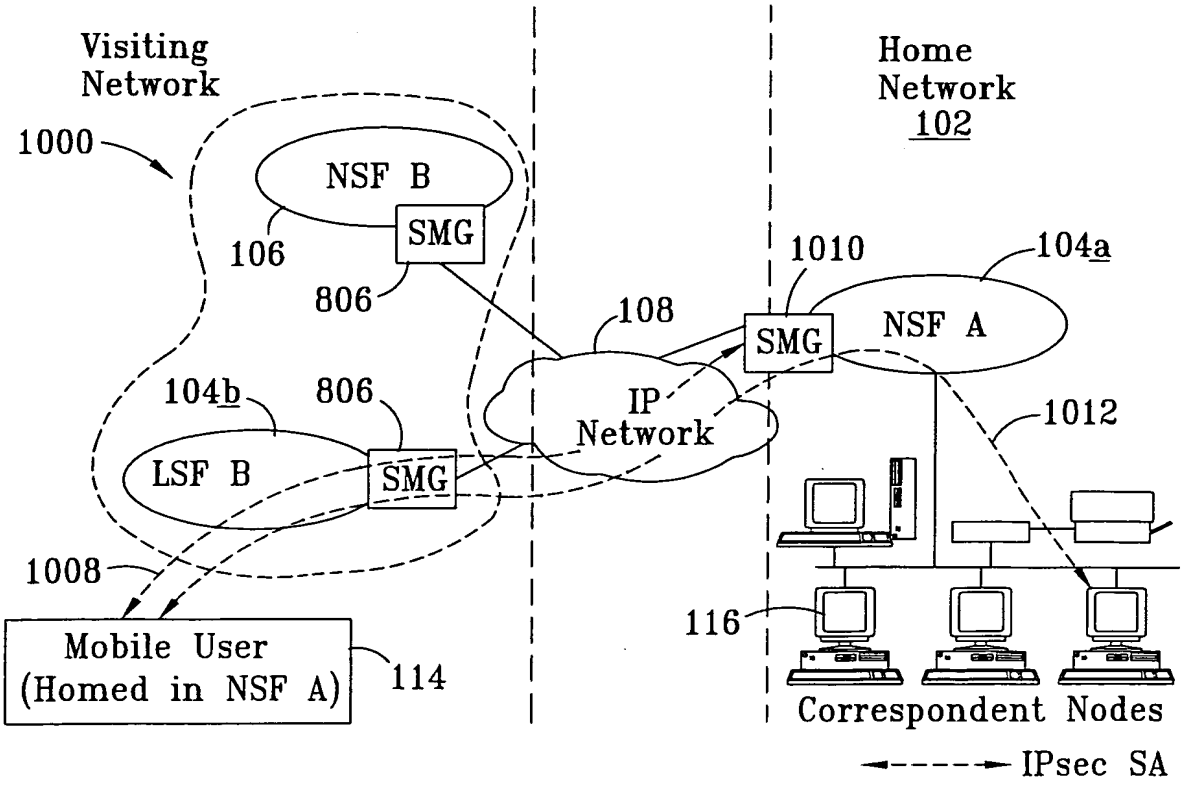
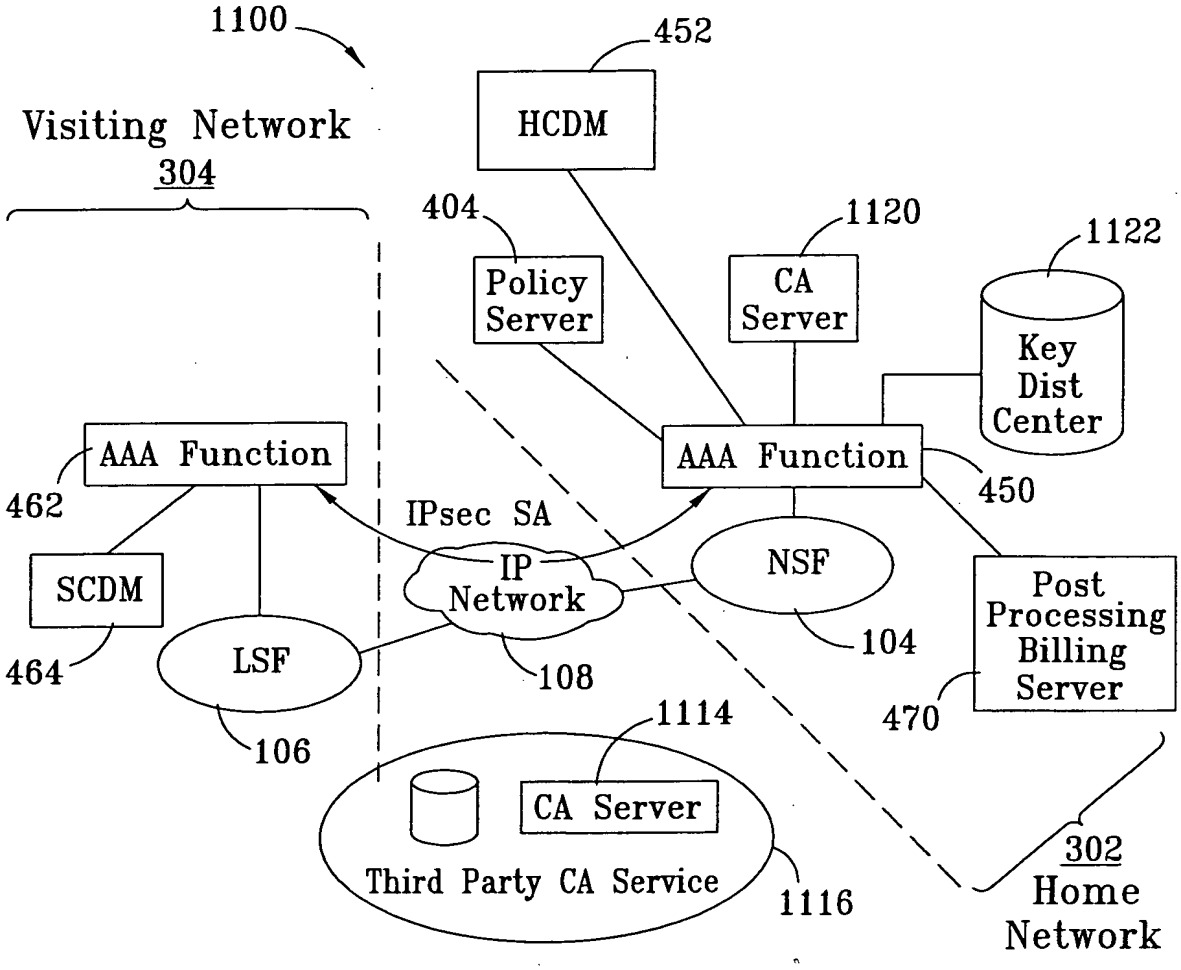

Visiting
Network
Home
Network
102
1000
NSF B
106
SMG
806
1010
104a
NSF A
SMG
108
104b
806
IP
Network
1012
LSF B
SMG
1008
116
Mobile User
(Homed in NSF A)
114
Correspondent Nodes
IPsec SA

FIG. 11


1100
Visiting Network
304
452
HCDM
404
Policy Server
1120
CA Server
1122
Key Dist Center
AAA Function
462
AAA Function
450
IPsec SA
IP Network
NSF
104
SCDM
464
LSF
106
108
Post Processing Billing Server
470
1114
CA Server
Third Party CA Service
1116
302
Home Network

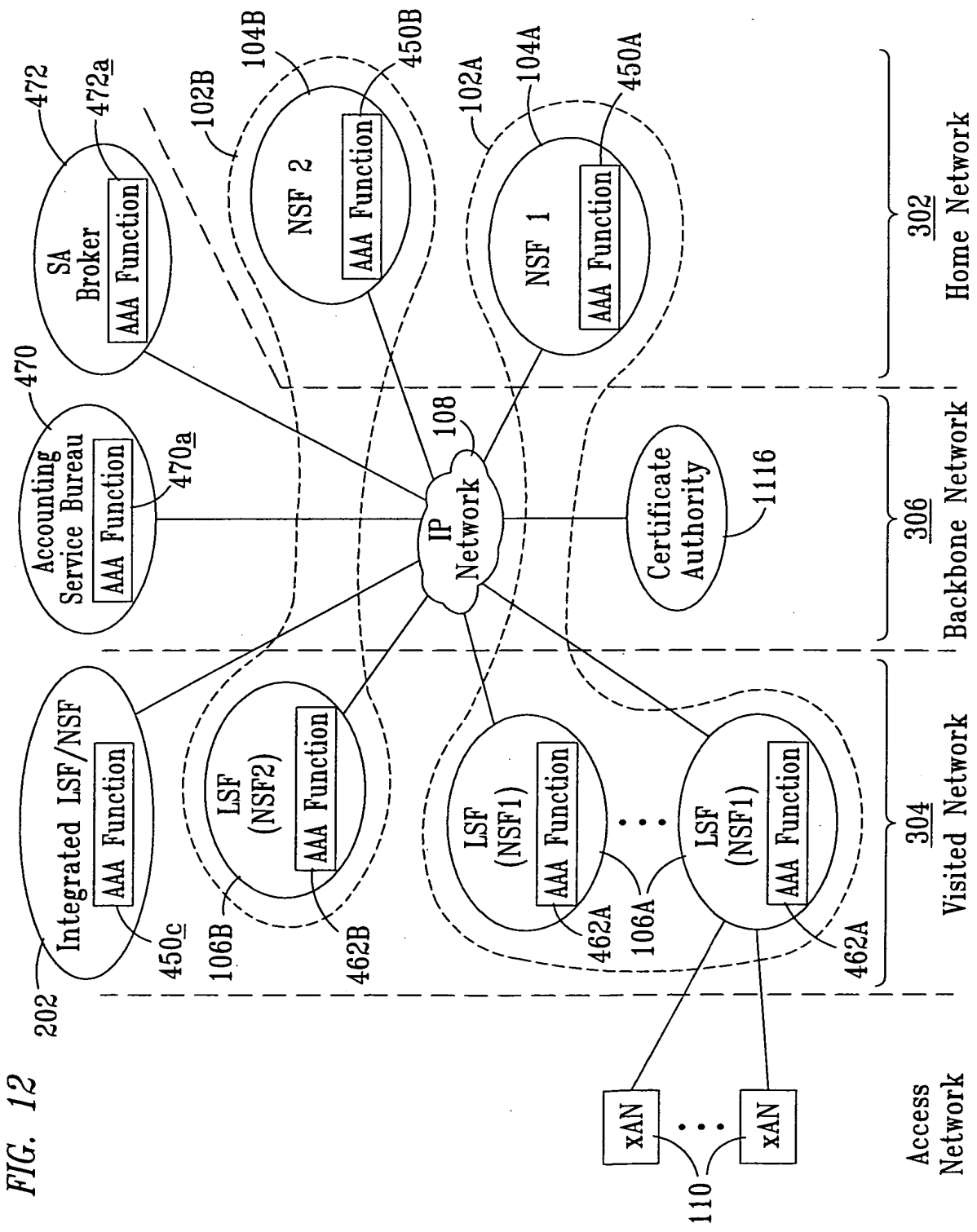

472
472a
SA Broker
AAA Function
470
Accounting Service Bureau
AAA Function
470a
102B
104B
NSF 2
AAA Function
450B
102A
104A
NSF 1
AAA Function
450A
108
IP Network
Certificate Authority
1116
302
Home Network
306
Backbone Network
304
Visited Network
Access Network
202
Integrated LSF/NSF
AAA Function
450c
106B
LSF (NSF2)
AAA Function
462B
LSF (NSF1)
AAA Function
462A
106A
LSF (NSF1)
AAA Function
462A
xAN
xAN
110

FIG. 12

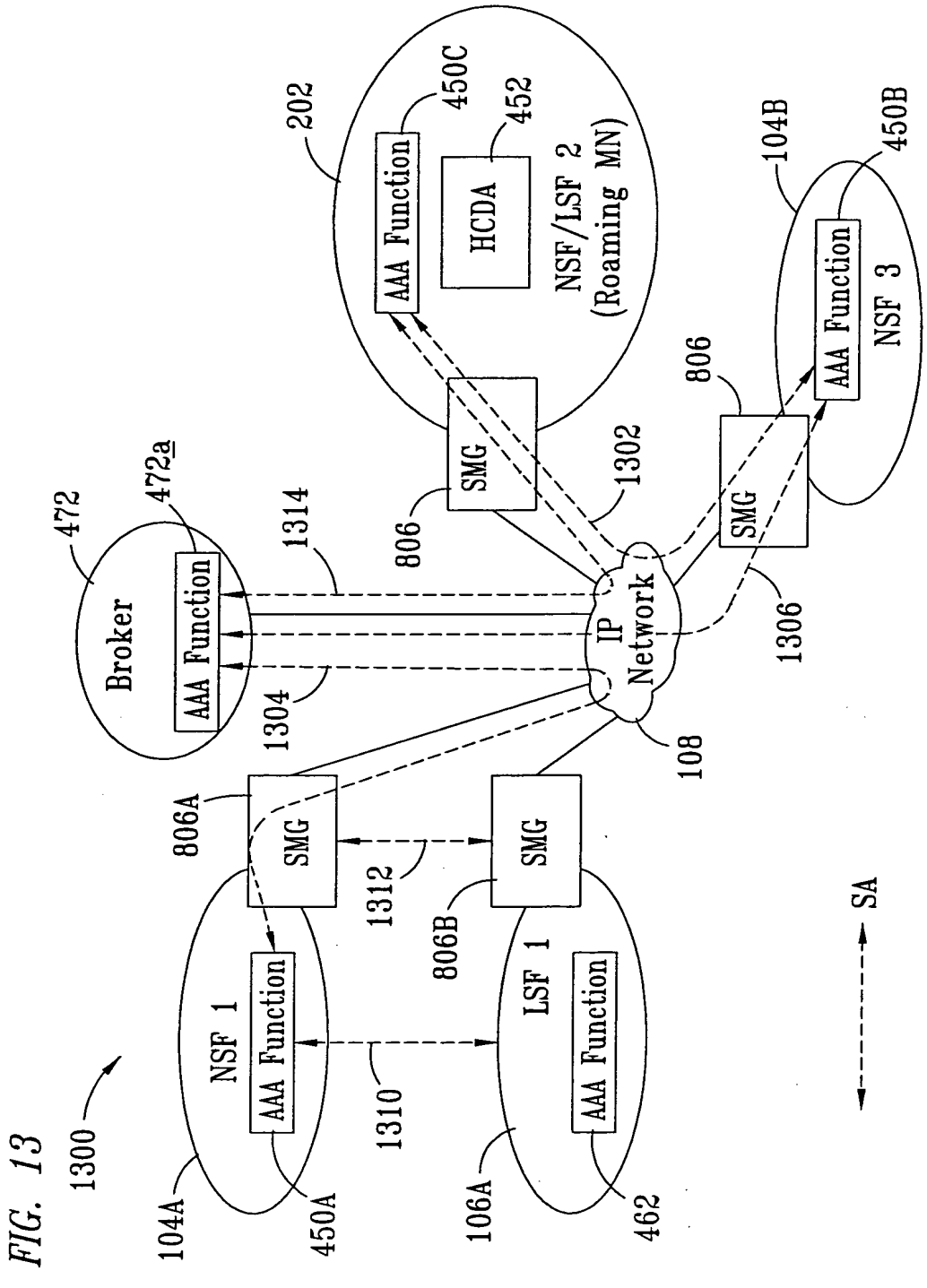

1300
104A
NSF 1
AAA Function
450A
1310
106A
LSF 1
AAA Function
462
806A
SMG
1312
806B
SMG
1304
Broker
AAA Function
472
472a
1314
108
IP Network
1302
806
SMG
202
AAA Function
450C
HCDA
452
NSF/LSF 2
(Roaming MN)
806
SMG
1306
104B
AAA Function
450B
NSF 3
SA

FIG. 13

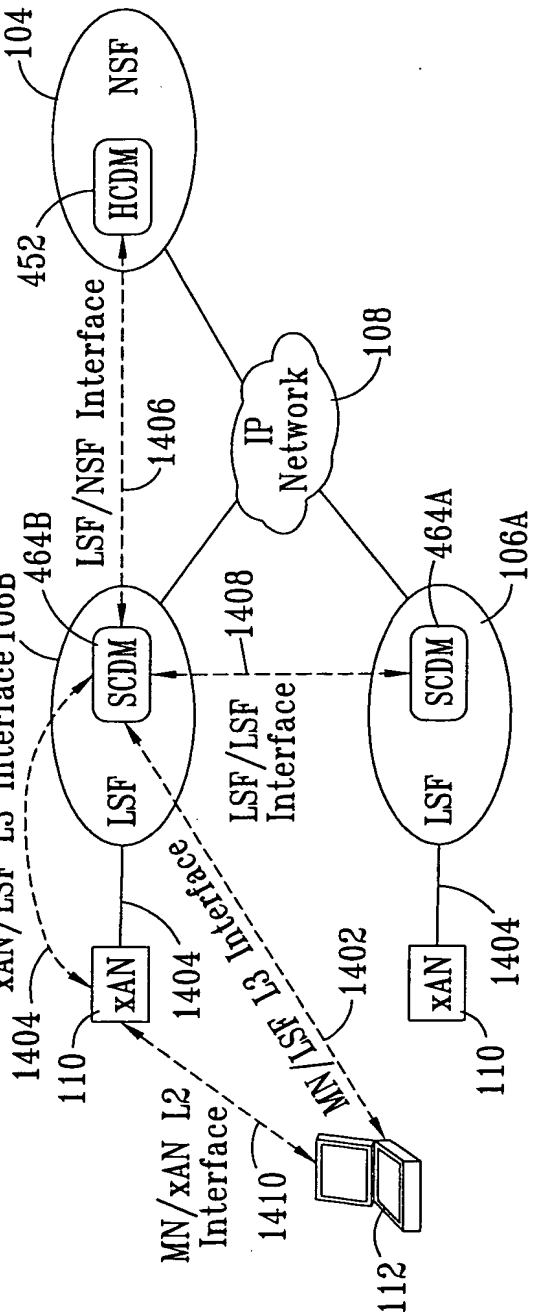

104
NSF
HCDM
452
LSF/NSF Interface
1406
IP
Network
108
464B
106B
SCDM
LSF
1408
LSF/LSF
Interface
464A
106A
SCDM
LSF
xAN/LSF L3 Interface
1404
xAN
110
1404
MN/xAN L2
Interface
1410
MN/LSF L3 Interface
1402
xAN
110
1404
112

FIG. 14

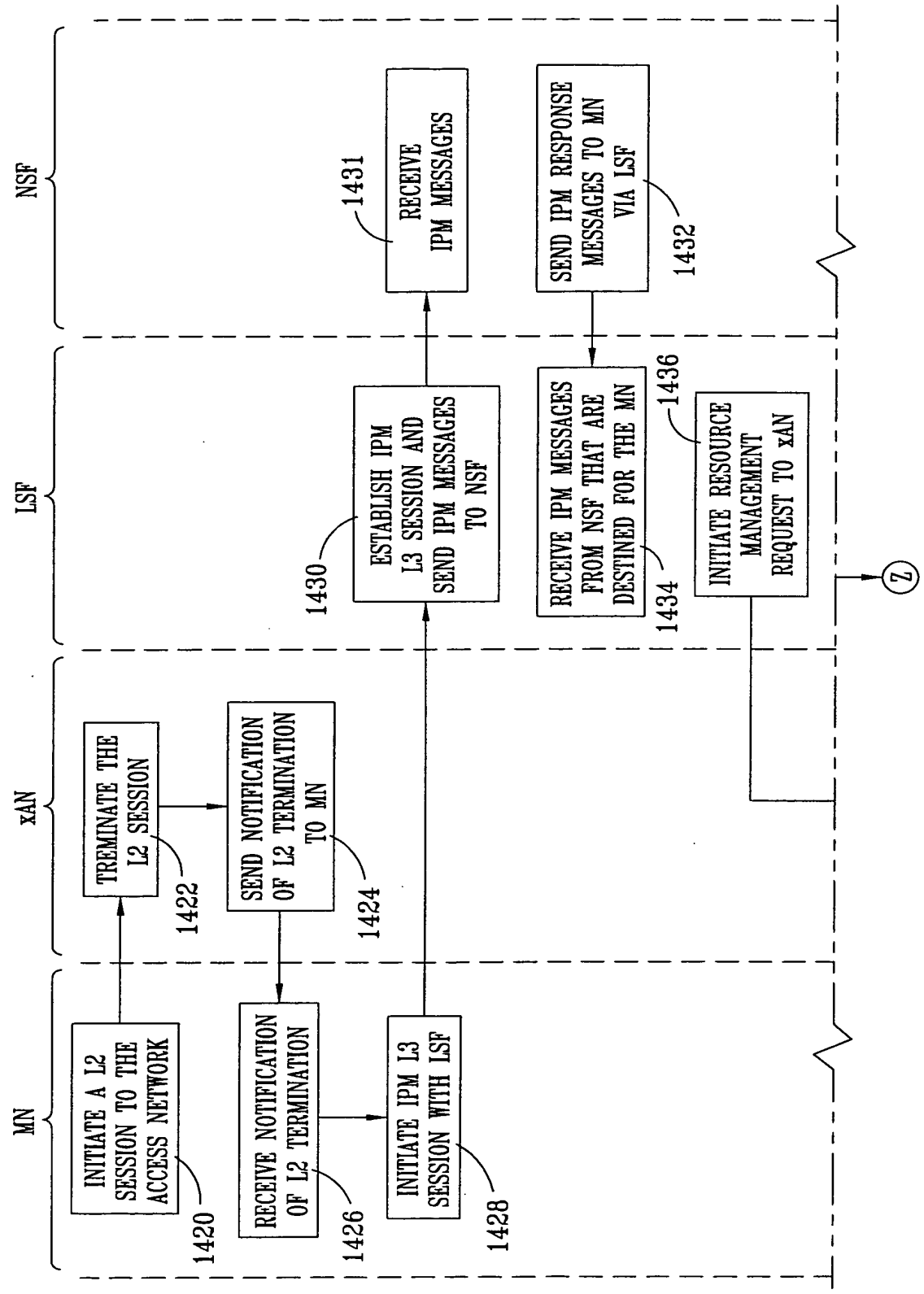

NSF
LSF
xAN
MN
INITIATE A L2 SESSION TO THE ACCESS NETWORK
1420
TREMINATE THE L2 SESSION
1422
RECEIVE NOTIFICATION OF L2 TERMINATION
1426
SEND NOTIFICATION OF L2 TERMINATION TO MN
1424
INITIATE IPM L3 SESSION WITH LSF
1428
ESTABLISH IPM L3 SESSION AND SEND IPM MESSAGES TO NSF
1430
RECEIVE IPM MESSAGES
1431
RECEIVE IPM MESSAGES FROM NSF THAT ARE DESTINED FOR THE MN
1434
SEND IPM RESPONSE MESSAGES TO MN VIA LSF
1432
INITIATE RESOURCE MANAGEMENT REQUEST TO xAN
1436
Z

FIG. 14A

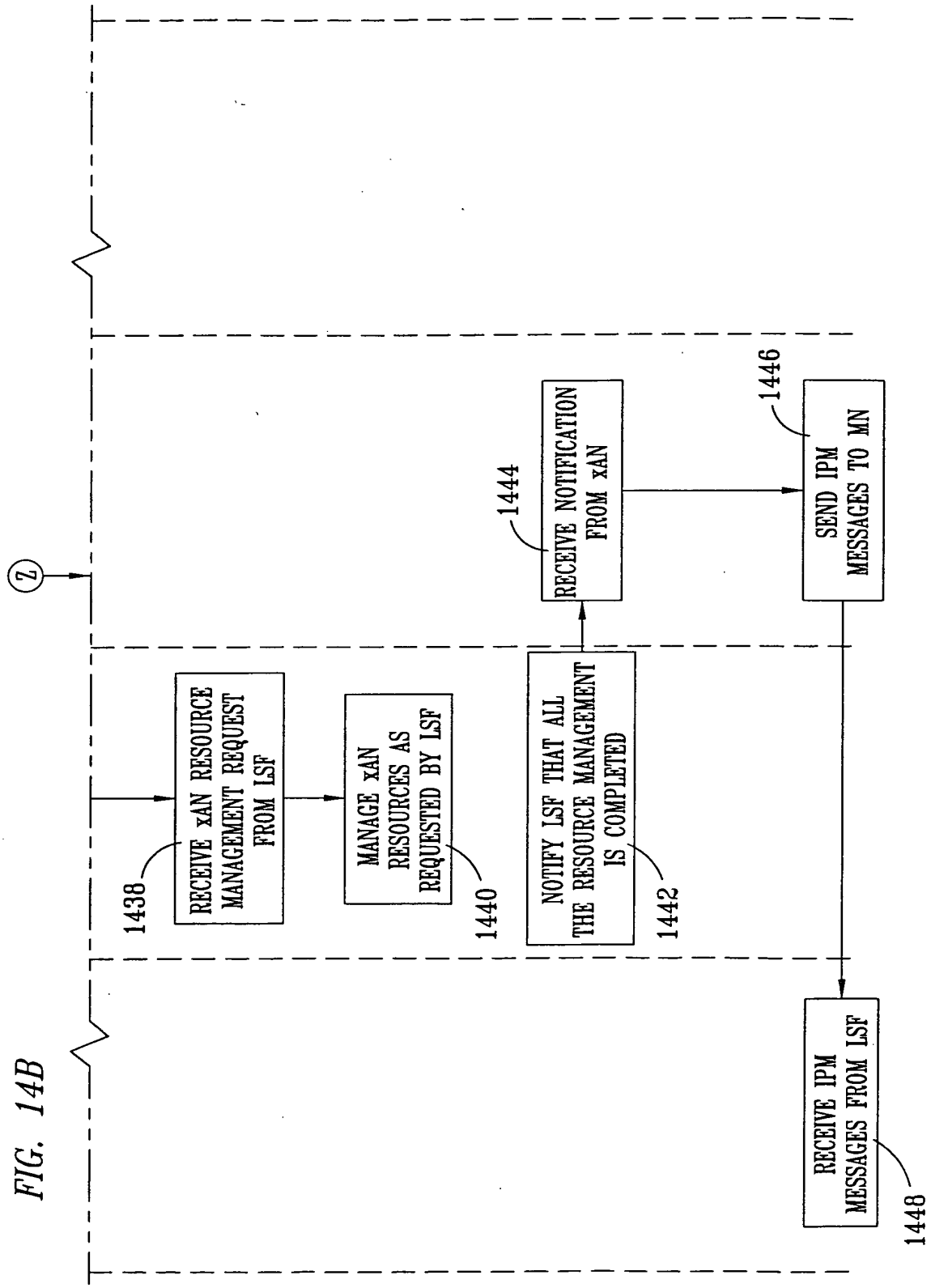

Z
RECEIVE xAN RESOURCE MANAGEMENT REQUEST FROM LSF
1438
MANAGE xAN RESOURCES AS REQUESTED BY LSF
1440
NOTIFY LSF THAT ALL THE RESOURCE MANAGEMENT IS COMPLETED
1442
RECEIVE NOTIFICATION FROM xAN
1444
SEND IPM MESSAGES TO MN
1446
RECEIVE IPM MESSAGES FROM LSF
1448

FIG. 14B

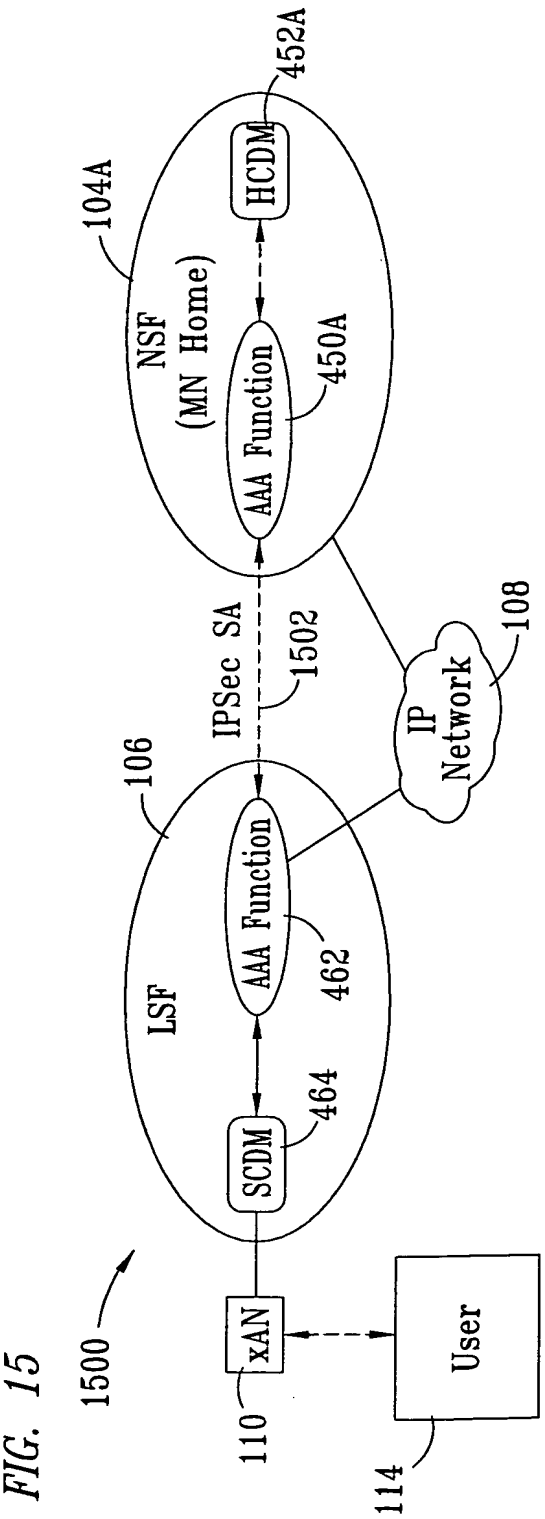

1500
104A
NSF
(MN Home)
AAA Function
450A
HCDM
452A
IPSec SA
1502
106
LSF
AAA Function
462
SCDM
464
IP
Network
108
xAN
110
User
114

FIG. 15

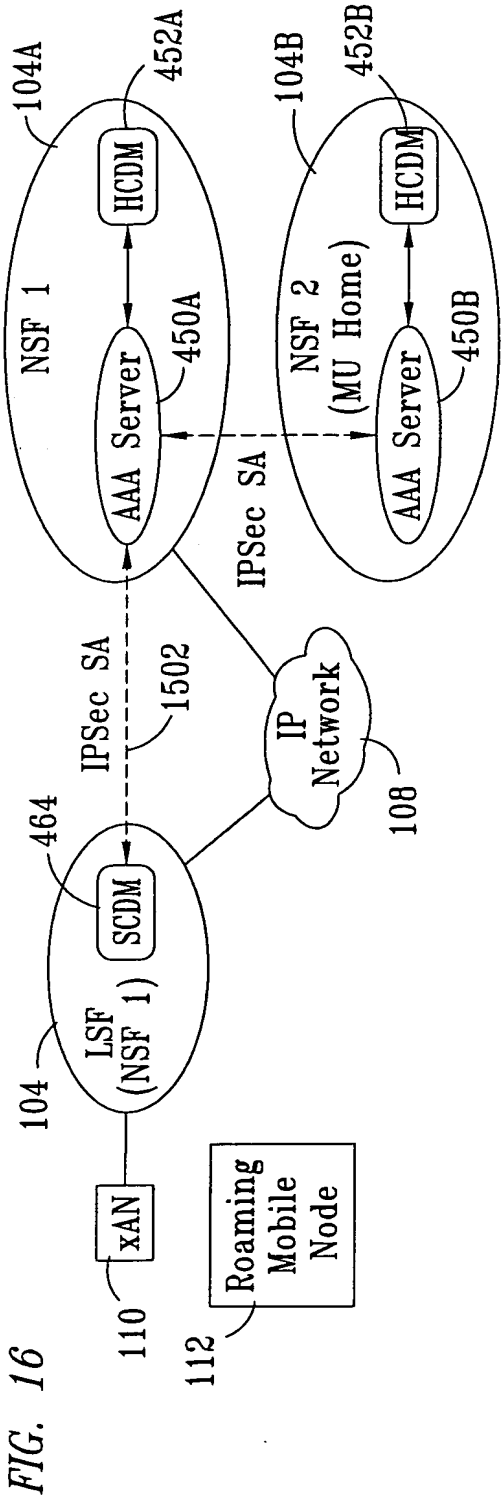

NSF 1
104A
HCDM
452A
AAA Server
450A
NSF 2
(MU Home)
104B
HCDM
452B
AAA Server
450B
IPSec SA
IPSec SA
1502
IP
Network
108
464
SCDM
LSF
(NSF 1)
104
xAN
110
Roaming
Mobile
Node
112

FIG. 16

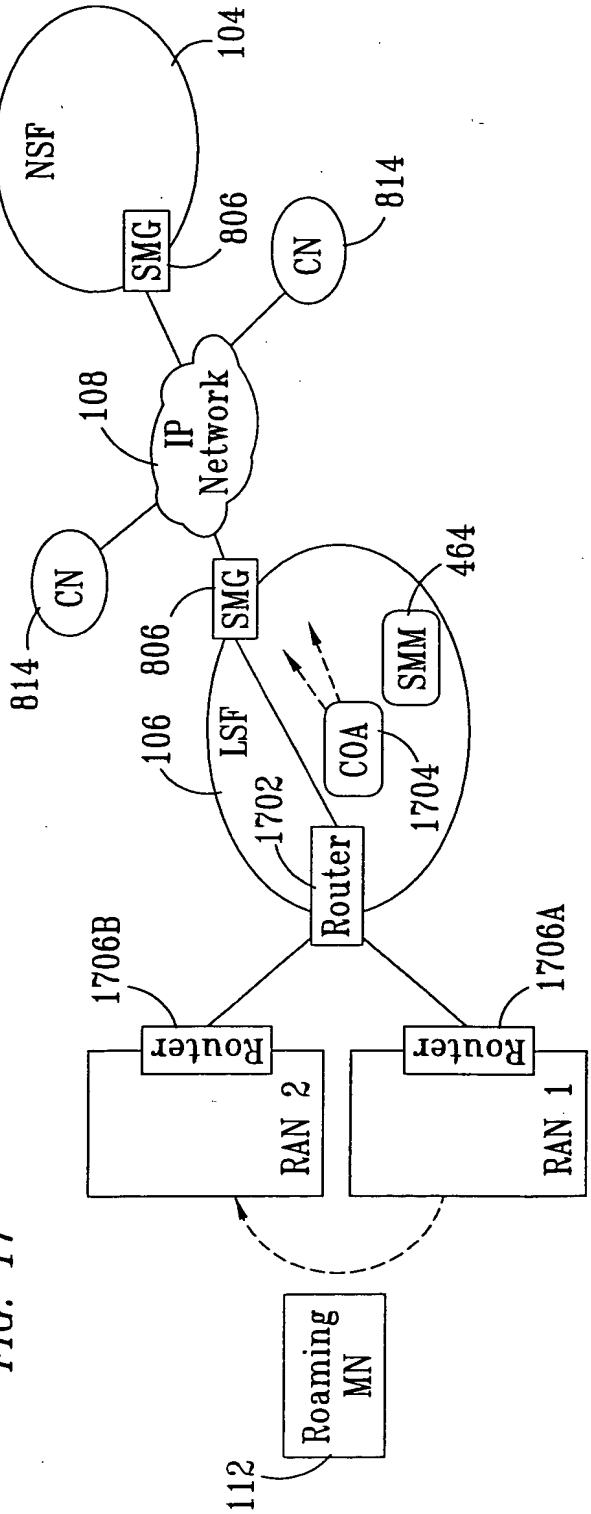

NSF
104
SMG
806
CN
814
IP
Network
108
CN
814
SMG
806
464
SMM
LSF
106
COA
1704
1702
Router
1706B
1706A
Router
Router
RAN 2
RAN 1
Roaming
MN
112

FIG. 17

FIG. 18

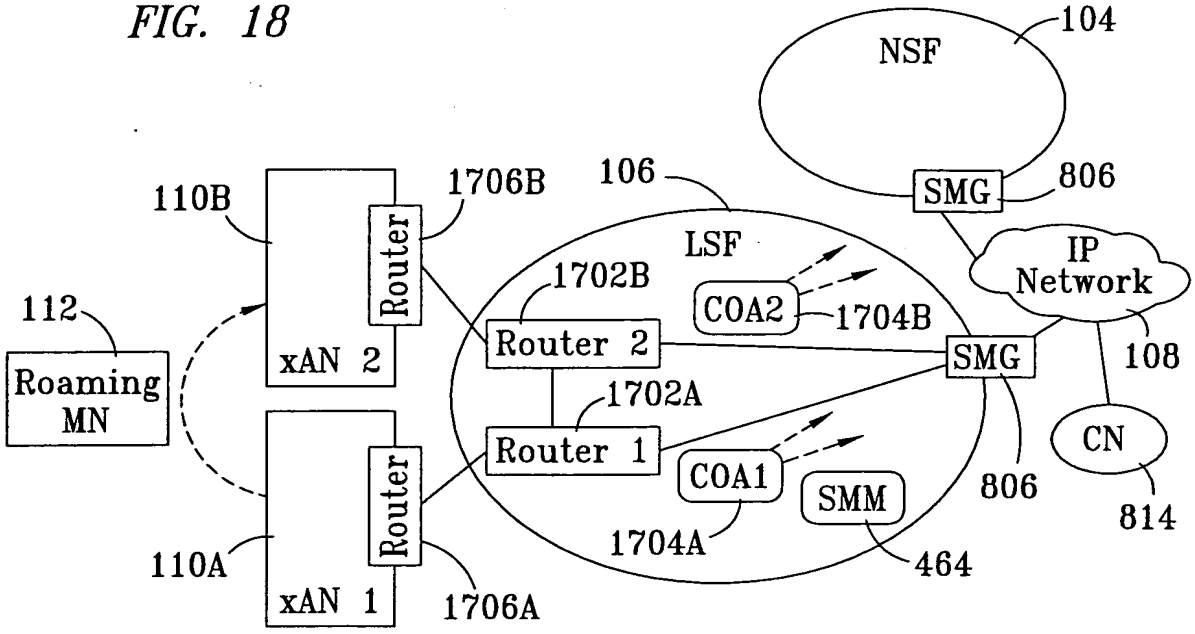
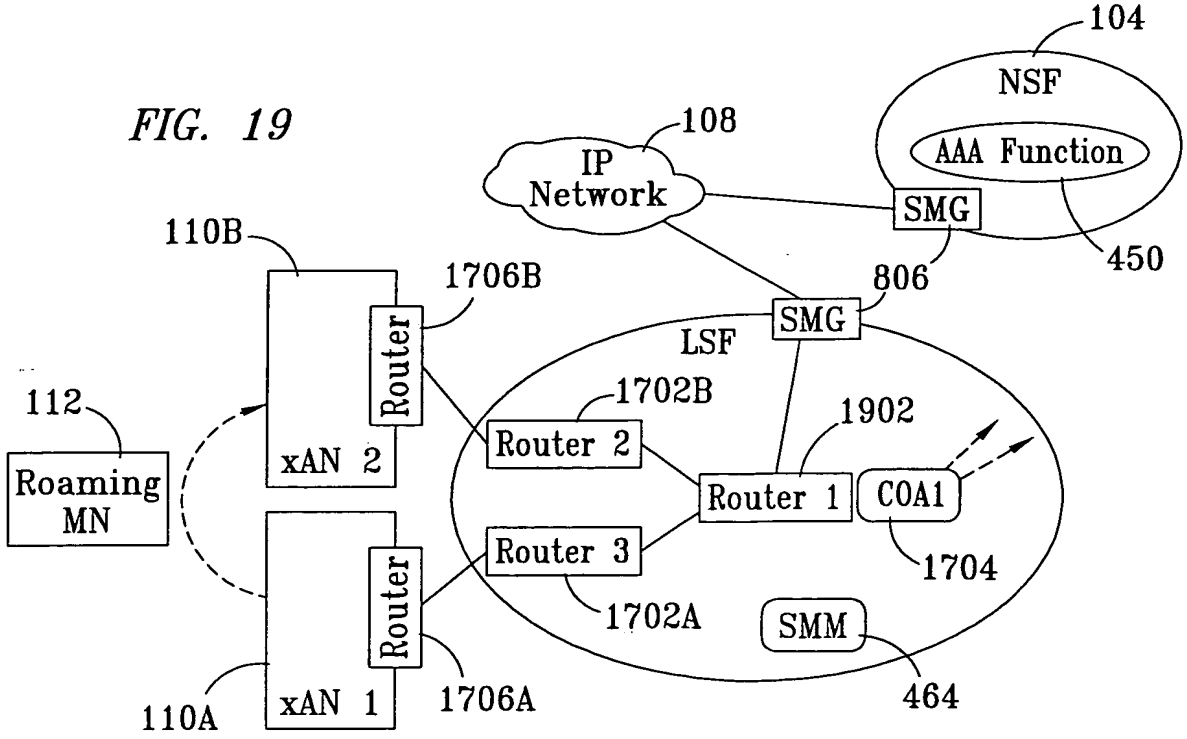

NSF
104
SMG
806
106
LSF
110B
1706B
Router
IP
Network
1702B
COA2
1704B
112
Roaming
MN
xAN 2
Router 2
SMG
108
1702A
Router 1
CN
COA1
SMM
806
814
110A
xAN 1
1706A
1704A
464

FIG. 19


104
NSF
AAA Function
108
IP
Network
SMG
450
110B
1706B
806
SMG
LSF
Router
1702B
1902
112
Roaming
MN
xAN 2
Router 2
Router 1
COA1
Router 3
1704
1702A
SMM
110A
xAN 1
1706A
464

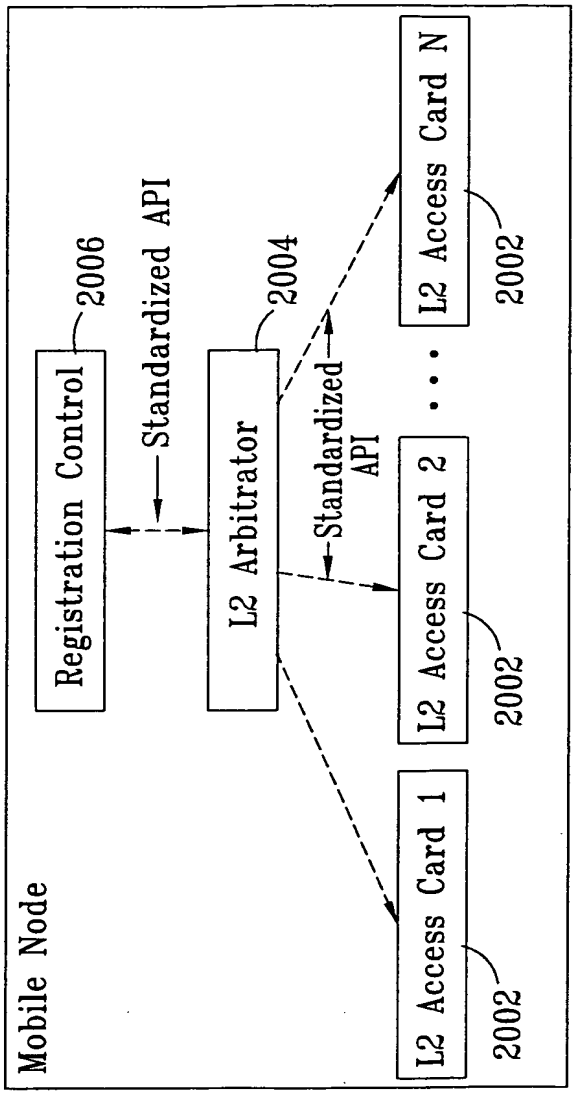

Mobile Node
Registration Control
2006
Standardized API
L2 Arbitrator
2004
Standardized API
L2 Access Card 1
2002
L2 Access Card 2
2002
L2 Access Card N
2002

FIG. 20

FIG. 20A

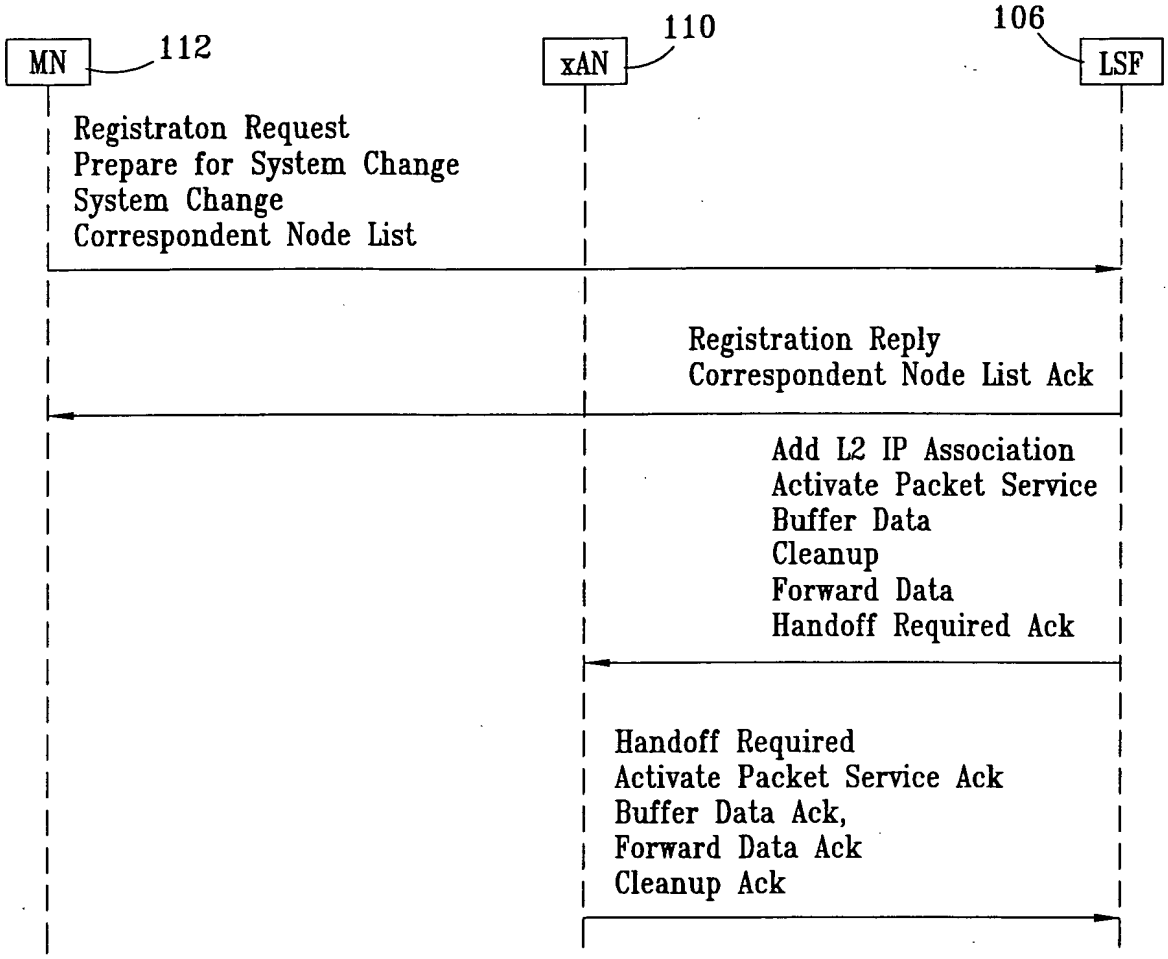


FIG. 20B

IP Header
UDP Header
Existing MIP Message or new IPM Message
IPM Extension(s)

Fig. 20C

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type								Length (n/4+1)								Data.....															
..	Data.....																															
n	Data.....																															

Fig. 20D

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 9								Length (n-2)								Digital Signature.....															
..	.....																															
n	.....Digital Signature																															

Fig. 20E

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 10								Length (n-2)								Reserved															
..	<User NAI 1+ User IP Address 1+ Service Definition for User>++ <User NAI 2+ User IP Address 2+ Service Definition for User>++.....																															
n	.....<User NAI n+ User IP Address n+ Service Definition for User>																															

Fig. 20F

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 11								Length (n-2)								<CN 1 IP Address> + <CN 2 IP Address>+.....															
..	.....																															
n	.....<CN n IP Address>																															

FIG. 20G

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 12								Length (n-2)								LSF NAI.....															
..	.....																															
n	.....LSF NAI																															

FIG. 20H

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 13								Length								MN L2 Address.....															
..	.....																															
n	.....MN L2 Address																															

FIG. 20I

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 14								Length								NAI.....															
..	.....																															
n	.....NAI																															

FIG. 20J

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 15								Length (n+4)								Routing Area NAI.....															
..	.....																															
n	.....Routing Area NAI																															

FIG. 20K

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 16								Length (n-2)								<Protocol Name 1> + <Protocol Name 2>+.....															
..	.....																															
n	.....<Protocol Name n>																															

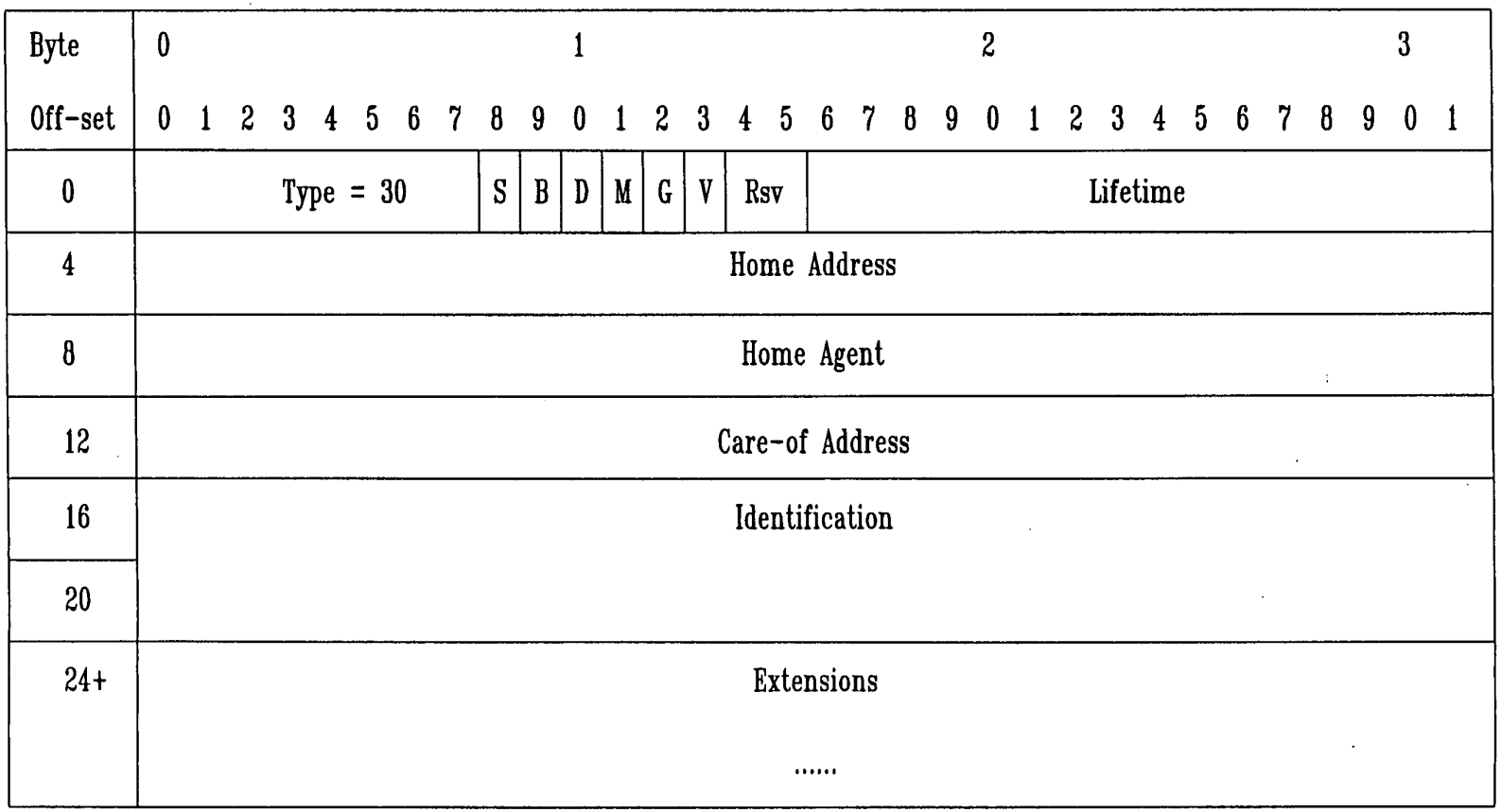
FIG. 20L

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 01								S	B	D	M	G	V	Rsv		Lifetime															
4	Home Address																															
8	Home Agent																															
12	Care-of Address																															
16	Identification																															
20																																
24+	Extensions																															

FIG. 20M

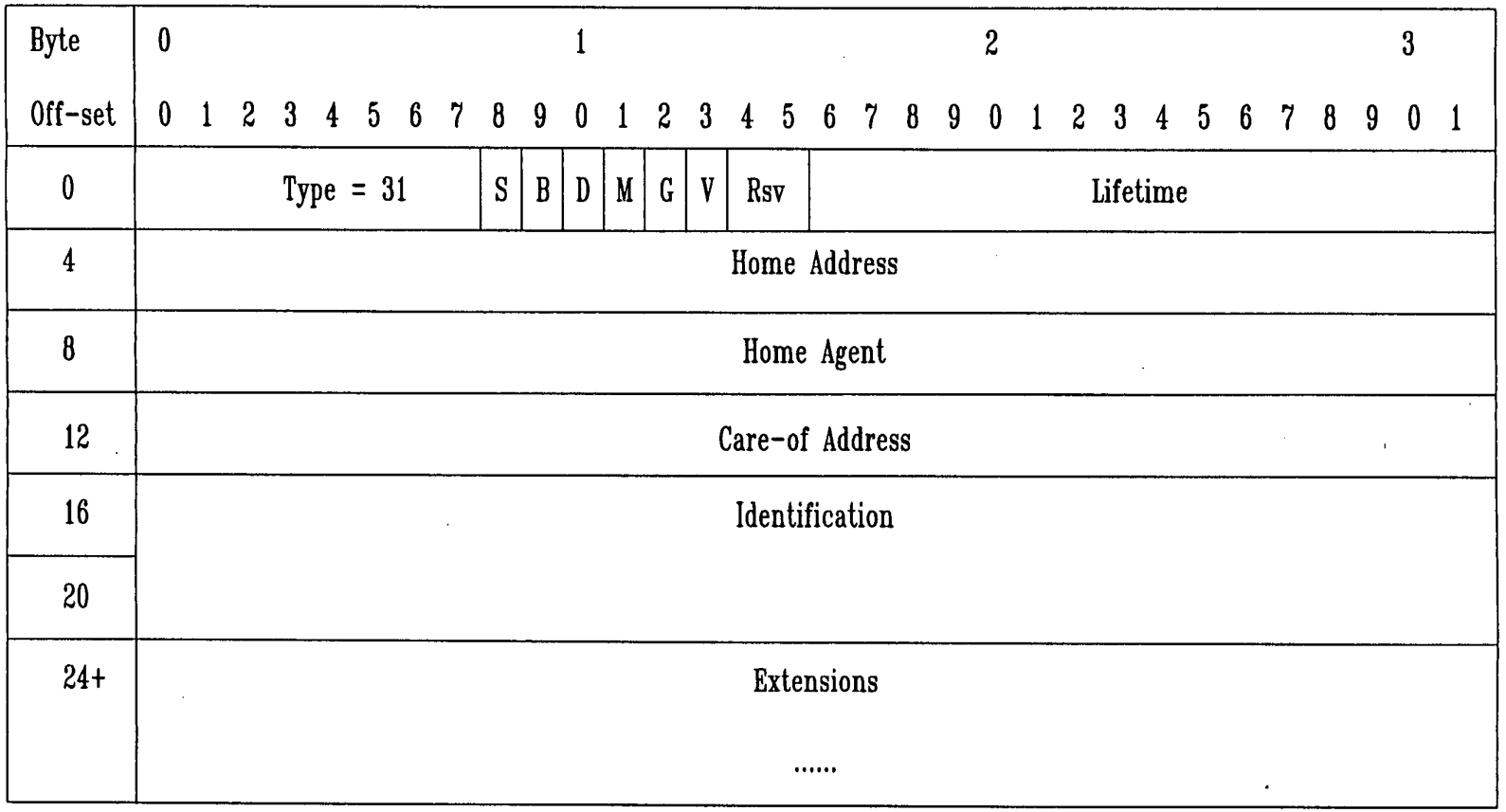
Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 03								Code								Lifetime															
4	Home Address																															
8	Home Agent																															
12	Identification																															
16																																
20+	Extensions																															

FIG. 20N



Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 30								S	B	D	M	G	V	Rsv		Lifetime															
4	Home Address																															
8	Home Agent																															
12	Care-of Address																															
16	Identification																															
20																																
24+	Extensions																															

FIG. 20O



Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 31								S	B	D	M	G	V	Rsv		Lifetime															
4	Home Address																															
8	Home Agent																															
12	Care-of Address																															
16	Identification																															
20																																
24+	Extensions																															

FIG. 20P

Byte Off-set	0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
0	Type | Length (n/4+1) | Data.....
..	Data.....
n	Data.....

FIG. 20Q

Byte Off-set	0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
0	Type = 40 | Length | Reserved
4+	Extensions .....

FIG. 20R

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 41								Length								Reserved															
4+	Extensions																															

FIG. 20S

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 40								Length								Reserved															
4	User IP Address																															
8+	Extensions																															

FIG. 20T

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 42								Length								Reserved															
4	User IP Address																															

FIG. 20U

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 43								Length								Result Code								Reserved							
4	User IP Address																															

FIG. 20V

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 44								Length								Reserved															
4	User IP Address																															

FIG. 20W

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 45								Length								Reserved															
4	User IP Address																															

FIG. 20X

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 46								Length								Reserved															
4+	Extensions																															

FIG. 20Y

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 47																Length								Reserved							
4	User NAI																															

FIG. 20Z

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 48																Length								Reserved							
4	User's IP Address at the old LSF																															
8	User's IP Address at the new LSF																															
12	User's COA at the new LSF																															

FIG. 20AA

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 49								Length								Reserved															
4	User IP Address at the old LSF																															

FIG. 20AB

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 50								Length								Reserved															
4+	Extensions																															

FIG. 20AC

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 51								Length								Reserved															
4+	Extensions																															

FIG. 20AD

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 30								Length								Reserved															
4	Access Request																															

FIG. 20AE

Byte Off-set	0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
0	Type = 31 | Length | Reserved
4	Access Accept/Reject

FIG. 20AF

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 32								S	B	D	M	G	V	Rsv		Lifetime															
4	Home Address																															
8	Home Agent																															
12	Care-of Address																															
16	Identification																															
20																																
24+	Extensions																															

FIG. 20AG

Byte	0								1								2								3			
Off-set	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
0	Type = 33								S	B	D	M	G	V	Rsv		Lifetime															
4	Home Address																															
8	Home Agent																															
12	Identification																															
16																																
20+	Extensions																															

FIG. 21

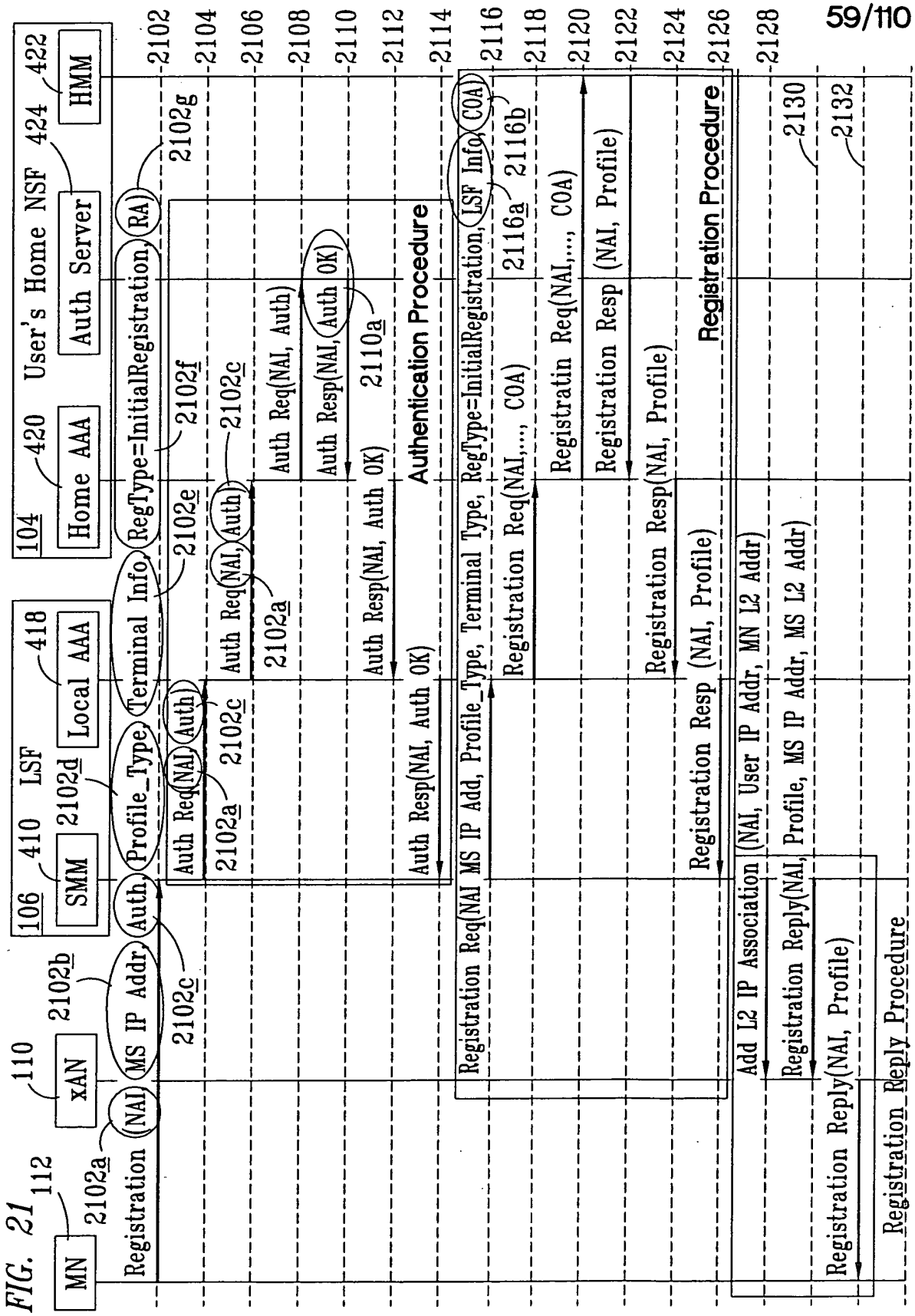

MN
112
2102a
Registration (NAI)
110
xAN
2102b
MS IP Addr
Auth
2102c
106
SMM
410
LSF
2102d
Profile_Type
Terminal Info
Local AAA
418
104
Home AAA
420
User's Home NSF
424
Auth Server
422
HMM
RegType=InitialRegistration
RA
2102g
2102e
2102f
Auth Req(NAI, Auth)
2102a
2102c
Auth Req(NAI, Auth)
Auth Resp(NAI, Auth OK)
2110a
Auth Resp(NAI, Auth OK)
Authentication Procedure
Registration Req(NAI MS IP Add, Profile_Type, Terminal Type, RegType=InitialRegistration, LSF Info, COA)
2116a
2116b
Registration Req(NAI,..., COA)
Registratin Req(NAI,..., COA)
Registration Resp (NAI, Profile)
Registration Resp(NAI, Profile)
Registration Resp (NAI, Profile)
Registration Procedure
Add L2 IP Association (NAI, User IP Addr, MN L2 Addr)
Registration Reply(NAI, Profile, MS IP Addr, MS L2 Addr)
Registration Reply(NAI, Profile)
Registration Reply Procedure
2102
2104
2106
2108
2110
2112
2114
2116
2118
2120
2122
2124
2126
2128
2130
2132

FIG. 22

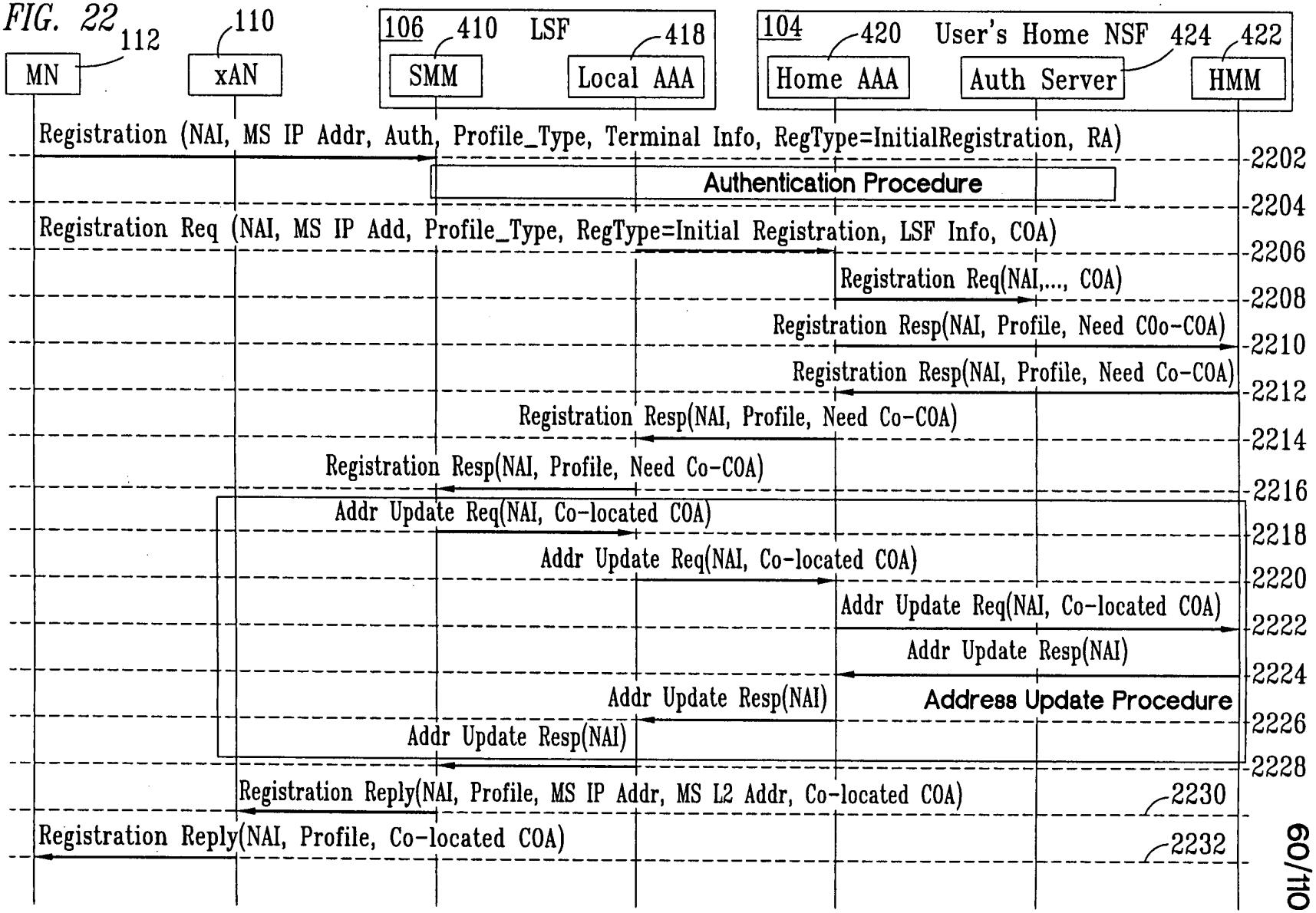
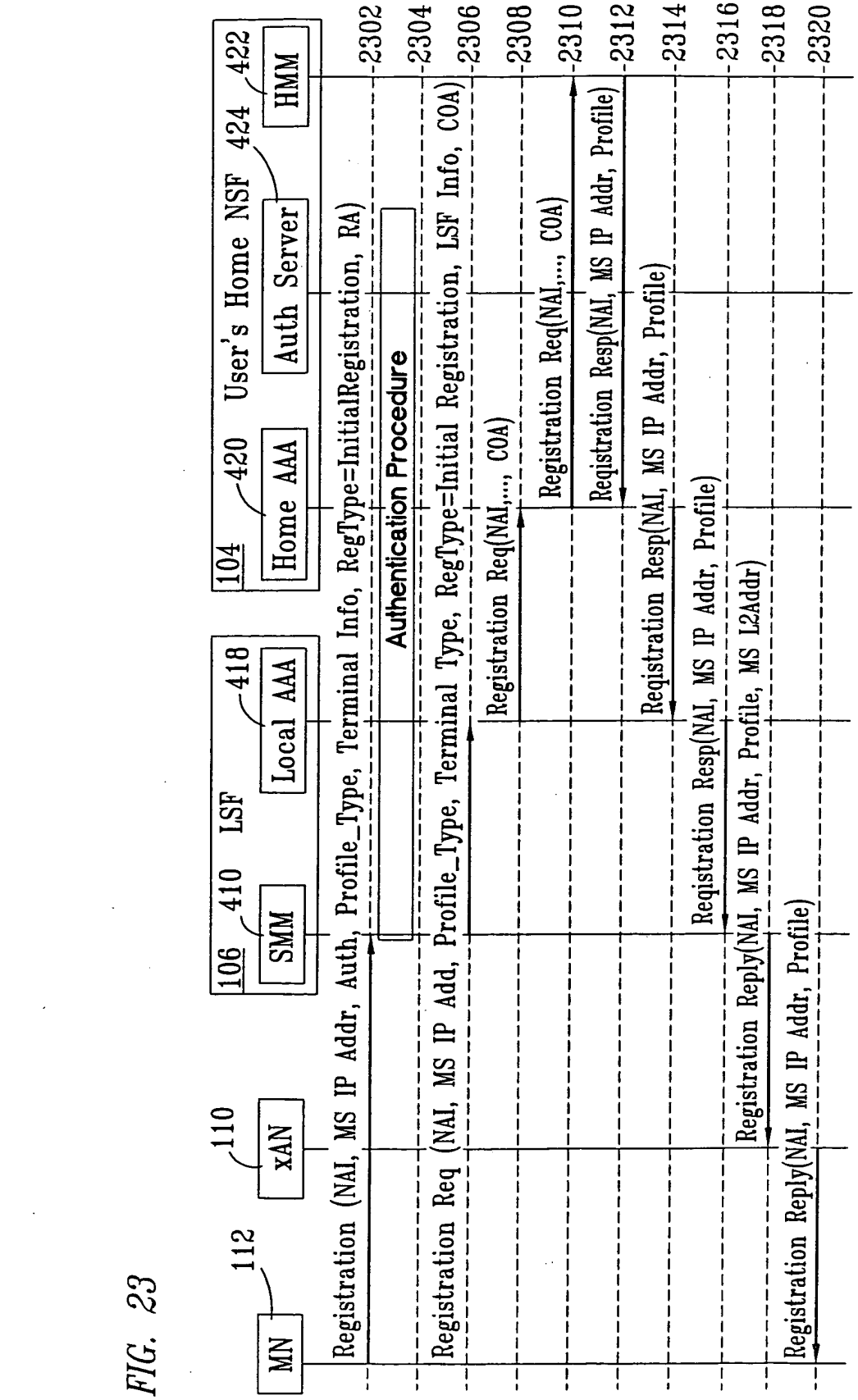


FIG. 23


MN
112
xAN
110
106
SMM
410
LSF
Local AAA
418
104
Home AAA
420
User's Home NSF
Auth Server
424
HMM
422
Registration (NAI, MS IP Addr, Auth, Profile_Type, Terminal Info, RegType=InitialRegistration, RA)
2302
Authentication Procedure
2304
Registration Req (NAI, MS IP Add, Profile_Type, Terminal Type, RegType=Initial Registration, LSF Info, COA)
2306
Registration Req(NAI,..., COA)
2308
Registration Req(NAI,..., COA)
2310
Registration Resp(NAI, MS IP Addr, Profile)
2312
Registration Resp(NAI, MS IP Addr, Profile)
2314
Registration Resp(NAI, MS IP Addr, Profile)
2316
Registration Reply(NAI, MS IP Addr, Profile, MS L2Addr)
2318
Registration Reply(NAI, MS IP Addr, Profile)
2320

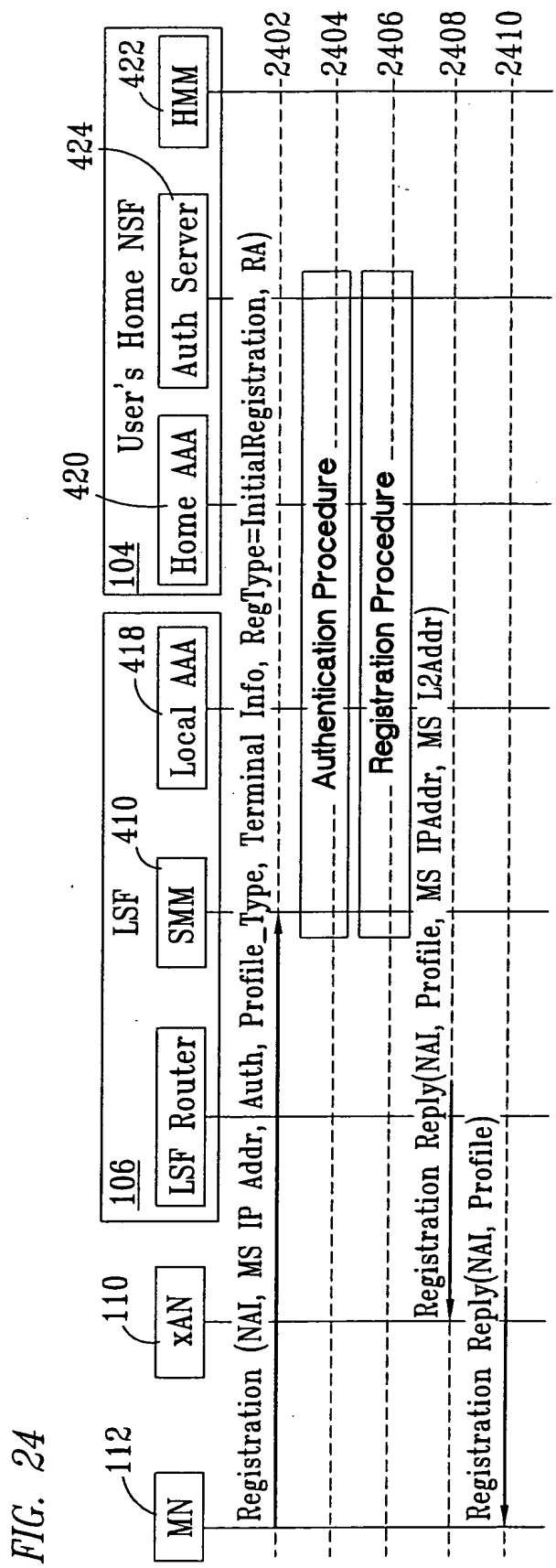
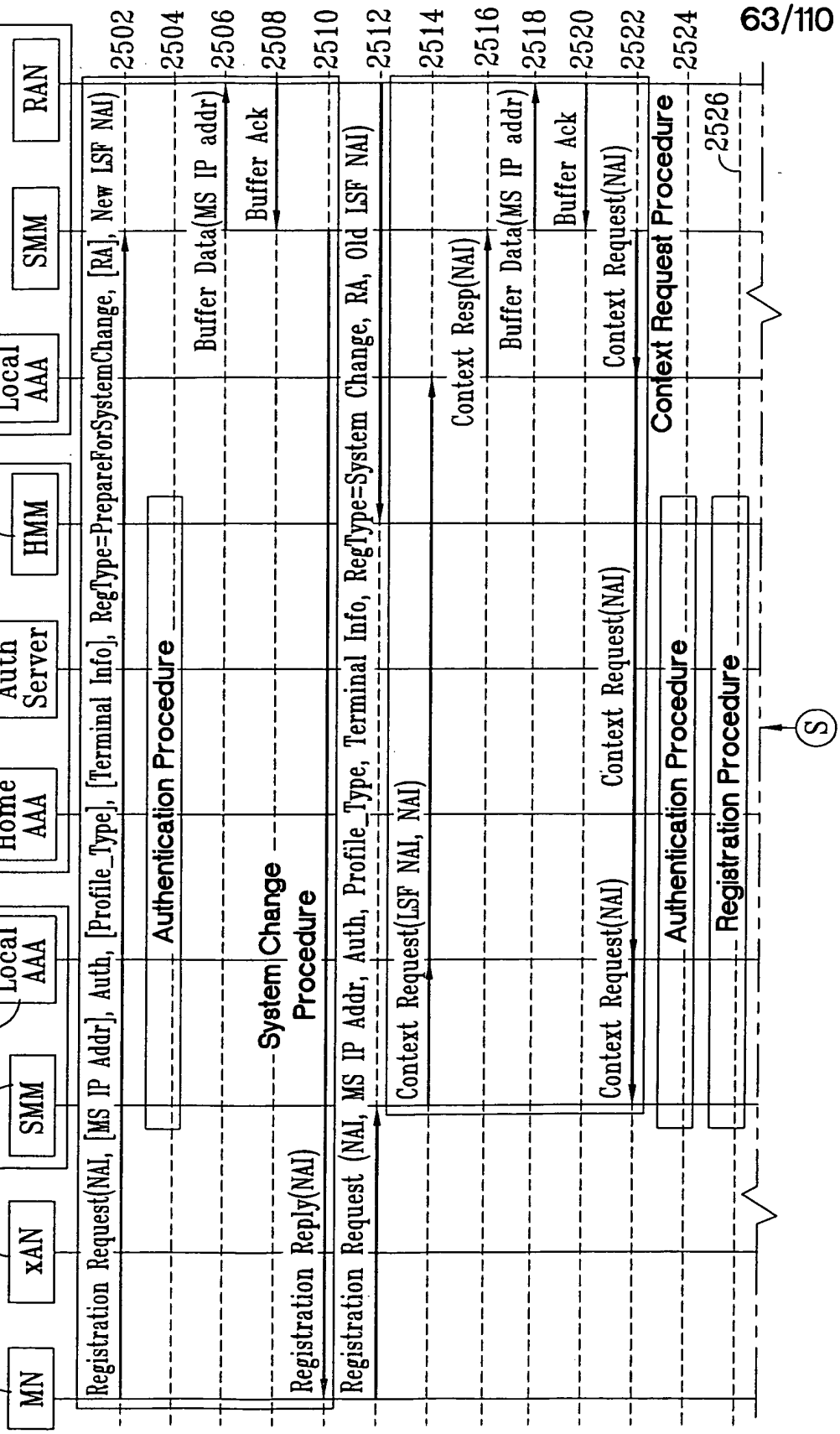

112
MN
110
xAN
106
LSF Router
LSF
410
SMM
418
Local AAA
420
104
Home AAA
424
User's Home NSF
Auth Server
422
HMM
Registration (NAI, MS IP Addr, Auth, Profile_Type, Terminal Info, RegType=InitialRegistration, RA)
2402
Authentication Procedure
2404
Registration Procedure
2406
Registration Reply(NAI, Profile, MS IPAddr, MS L2Addr)
2408
Registration Reply(NAI, Profile)
2410

FIG. 24

FIG. 25A


MN
112
xAN
110
New LSF
SMM
410
Local AAA
418
User's Home NSF
Home AAA
420
Auth Server
424
HMM
422
Old LSF
Local AAA
SMM
RAN
Registration Request(NAI, [MS IP Addr], Auth, [Profile_Type], [Terminal Info], RegType=PrepareForSystemChange, [RA], New LSF NAI)
2502
Authentication Procedure
2504
Buffer Data(MS IP addr)
2506
Buffer Ack
2508
System Change Procedure
Registration Reply(NAI)
2510
Registration Request (NAI, MS IP Addr, Auth, Profile_Type, Terminal Info, RegType=System Change, RA, Old LSF NAI)
2512
Context Request(LSF NAI, NAI)
2514
Context Resp(NAI)
2516
Buffer Data(MS IP addr)
2518
Buffer Ack
2520
Context Request(NAI)
Context Request(NAI)
2522
Context Request Procedure
2524
Authentication Procedure
Registration Procedure
2526
S

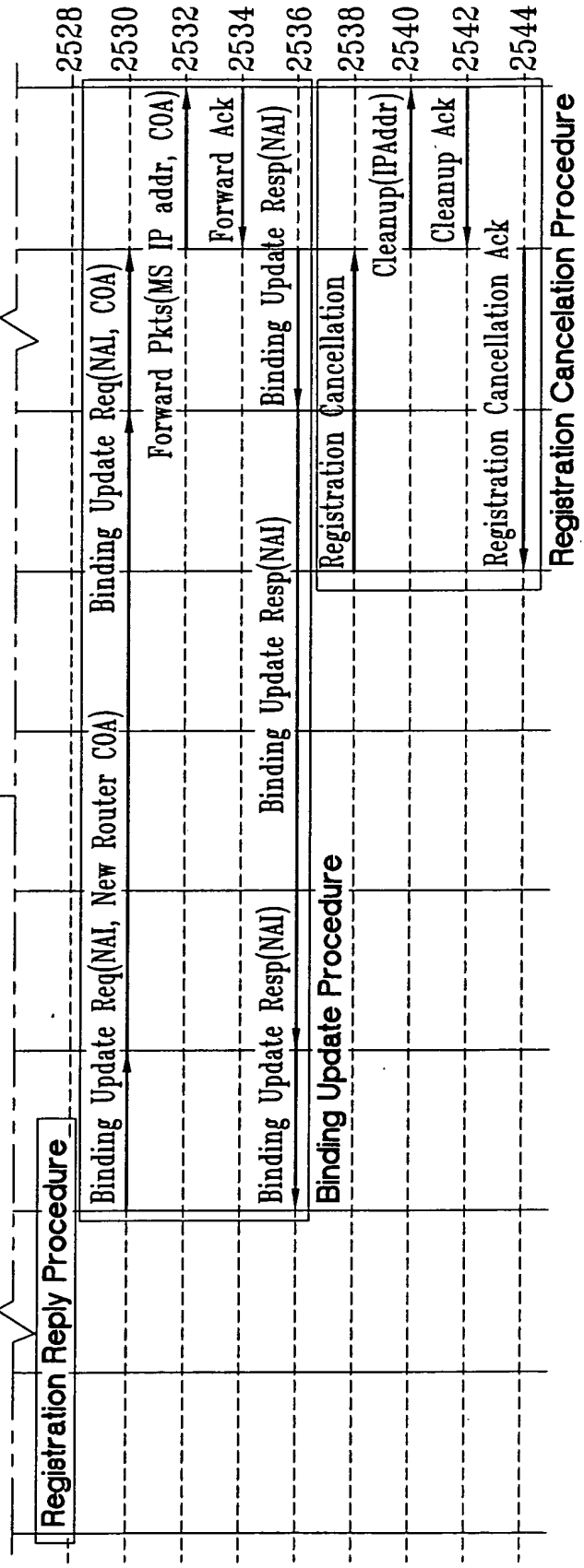

2528
2530
2532
2534
2536
2538
2540
2542
2544
S
Registration Reply Procedure
Binding Update Req(NAI, New Router COA)
Binding Update Req(NAI, COA)
Forward Pkts(MS IP addr, COA)
Forward Ack
Binding Update Resp(NAI)
Binding Update Resp(NAI)
Binding Update Procedure
Registration Cancellation
Cleanup(IPAddr)
Cleanup Ack
Registration Cancellation Ack
Registration Cancelation Procedure

FIG. 25B

FIG. 26

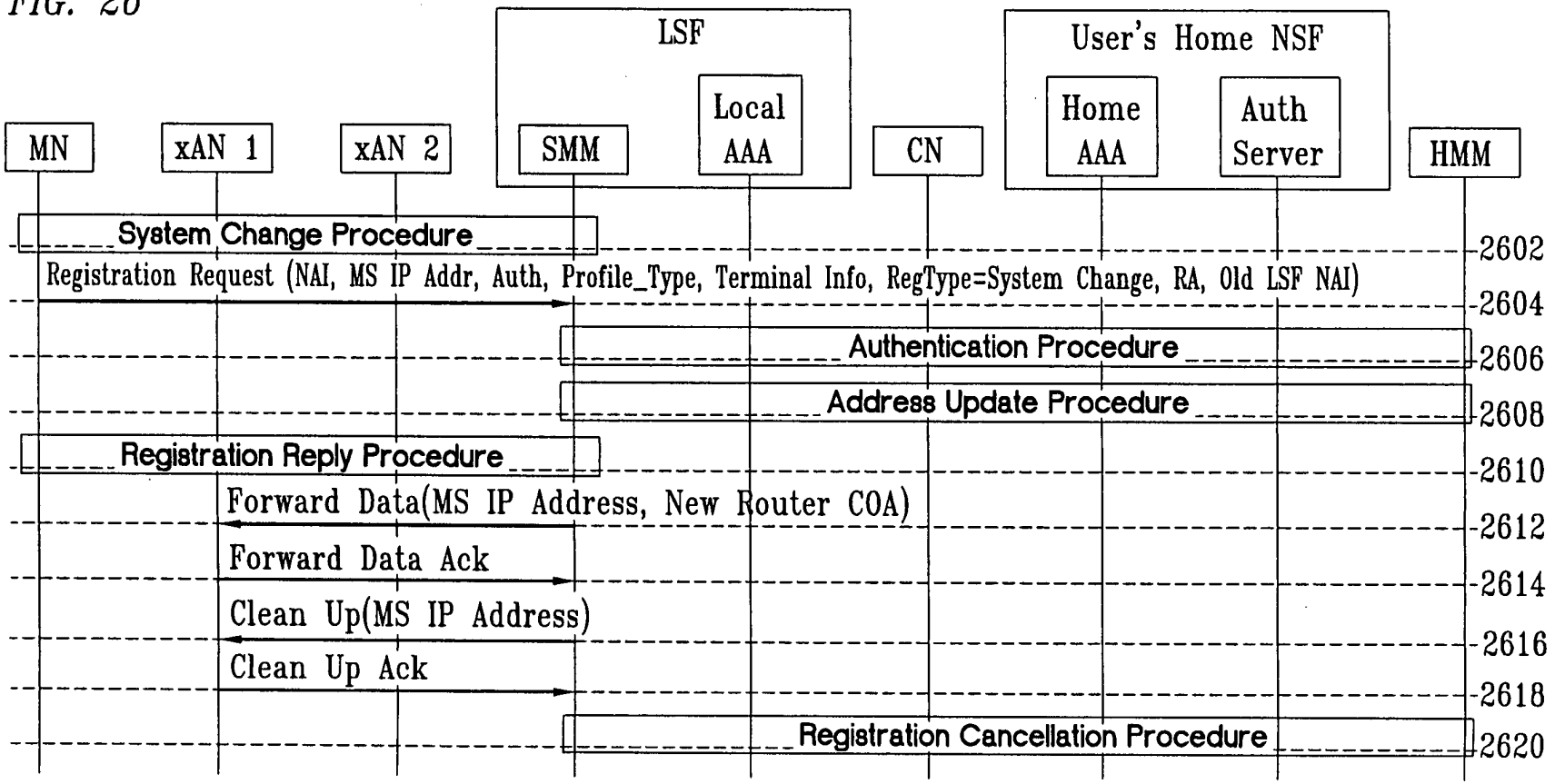
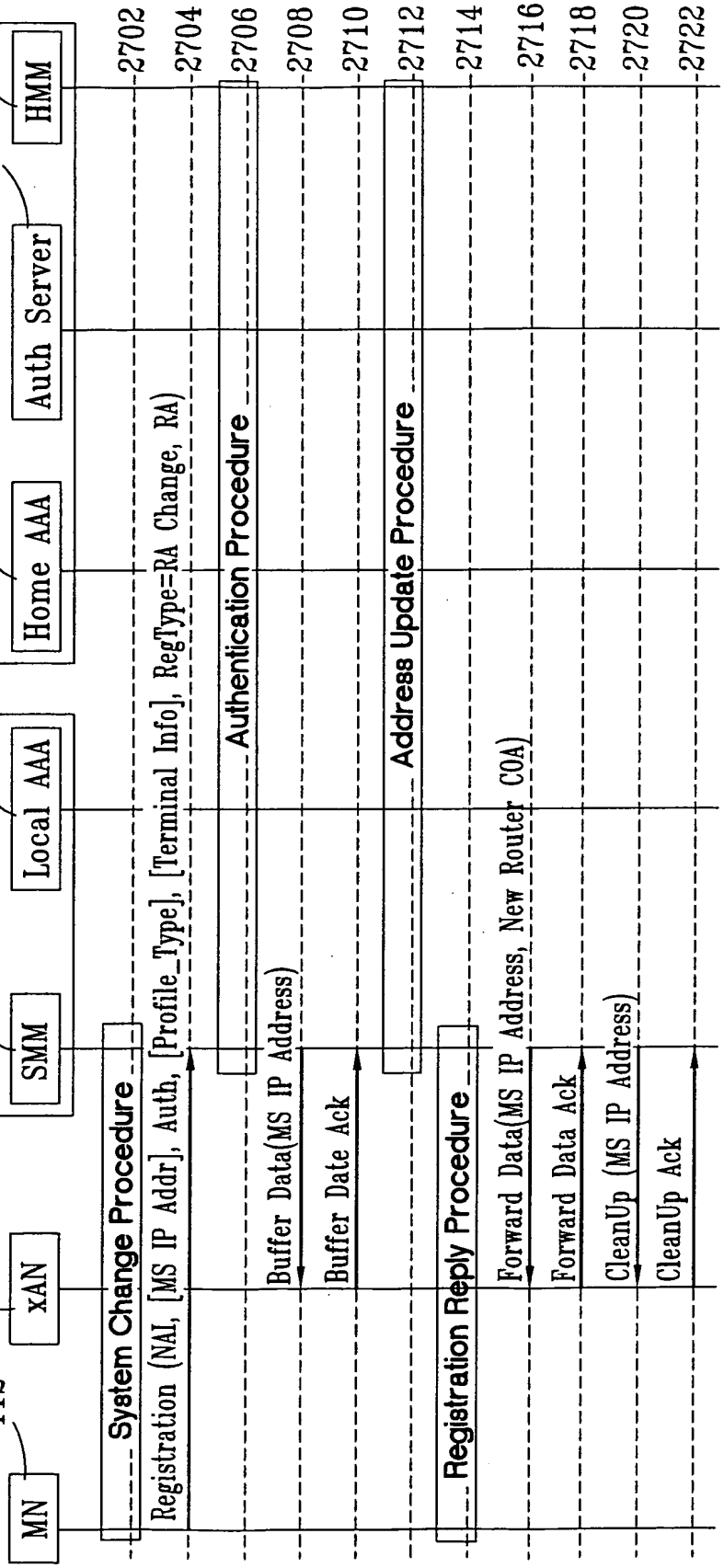


FIG. 27


MN
112
xAN
110
106
410
SMM
LSF
418
Local AAA
104
420
Home AAA
User's Home NSF
424
Auth Server
422
HMM
System Change Procedure
Registration (NAI, [MS IP Addr], Auth, [Profile_Type], [Terminal Info], RegType=RA Change, RA)
Authentication Procedure
Buffer Data(MS IP Address)
Buffer Date Ack
Address Update Procedure
Registration Reply Procedure
Forward Data(MS IP Address, New Router COA)
Forward Data Ack
CleanUp (MS IP Address)
CleanUp Ack
2702
2704
2706
2708
2710
2712
2714
2716
2718
2720
2722

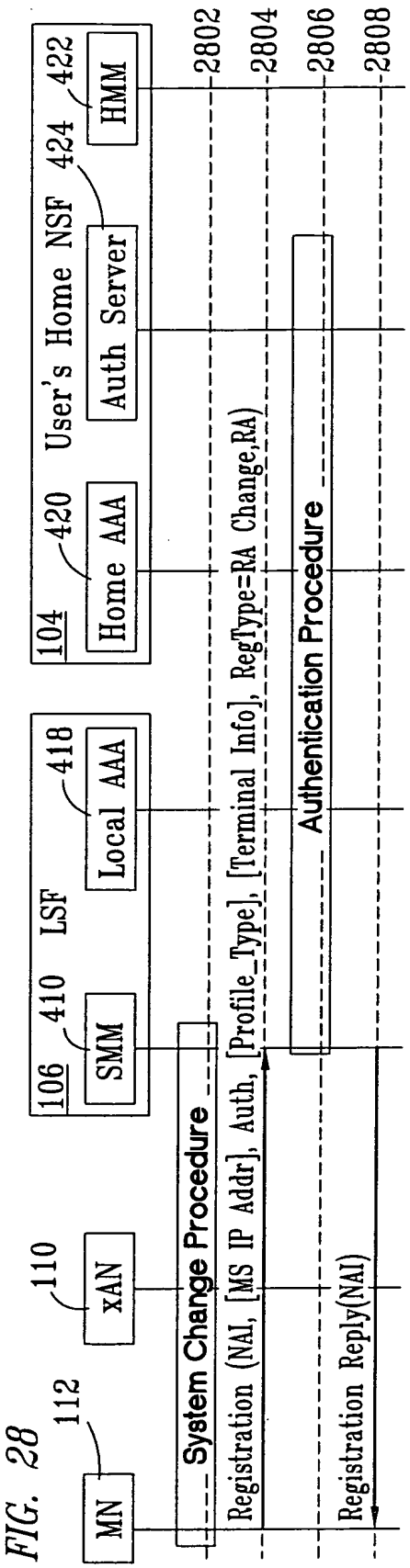
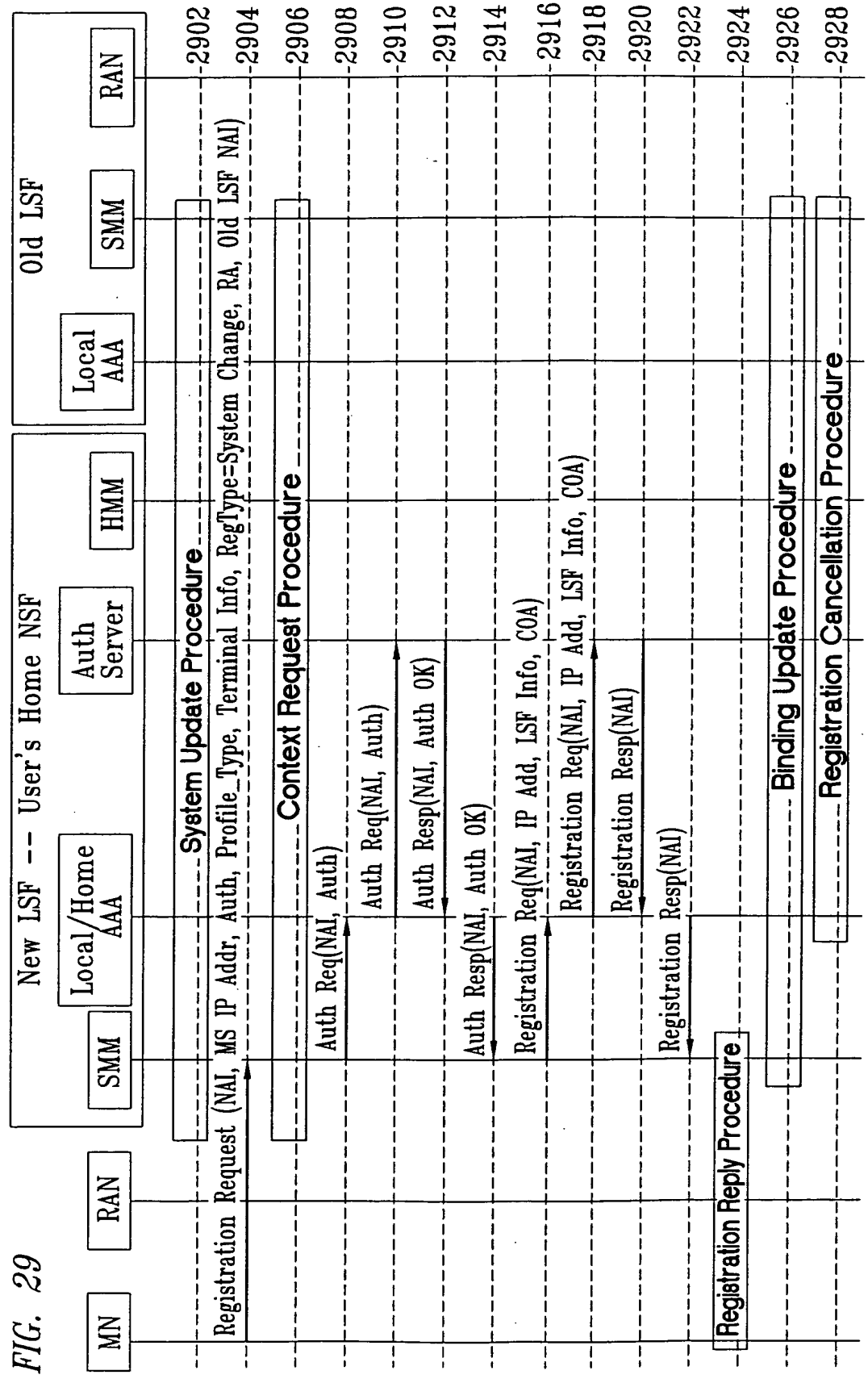

112
MN
110
xAN
106
410
SMM
LSF
418
Local AAA
104
420
Home AAA
User's Home NSF
424
Auth Server
422
HMM
2802
2804
2806
2808
System Change Procedure
Registration (NAI, [MS IP Addr], Auth, [Profile_Type], [Terminal Info], RegType=RA Change,RA)
Authentication Procedure
Registration Reply(NAI)

FIG. 28

FIG. 29


MN
RAN
New LSF -- User's Home NSF
SMM
Local/Home AAA
Auth Server
HMM
Old LSF
Local AAA
SMM
RAN
2902
2904
2906
2908
2910
2912
2914
2916
2918
2920
2922
2924
2926
2928
System Update Procedure
Registration Request (NAI, MS IP Addr, Auth, Profile_Type, Terminal Info, RegType=System Change, RA, Old LSF NAI)
Context Request Procedure
Auth Req(NAI, Auth)
Auth Req(NAI, Auth)
Auth Resp(NAI, Auth OK)
Auth Resp(NAI, Auth OK)
Registration Req(NAI, IP Add, LSF Info, COA)
Registration Req(NAI, IP Add, LSF Info, COA)
Registration Resp(NAI)
Registration Resp(NAI)
Registration Reply Procedure
Binding Update Procedure
Registration Cancellation Procedure

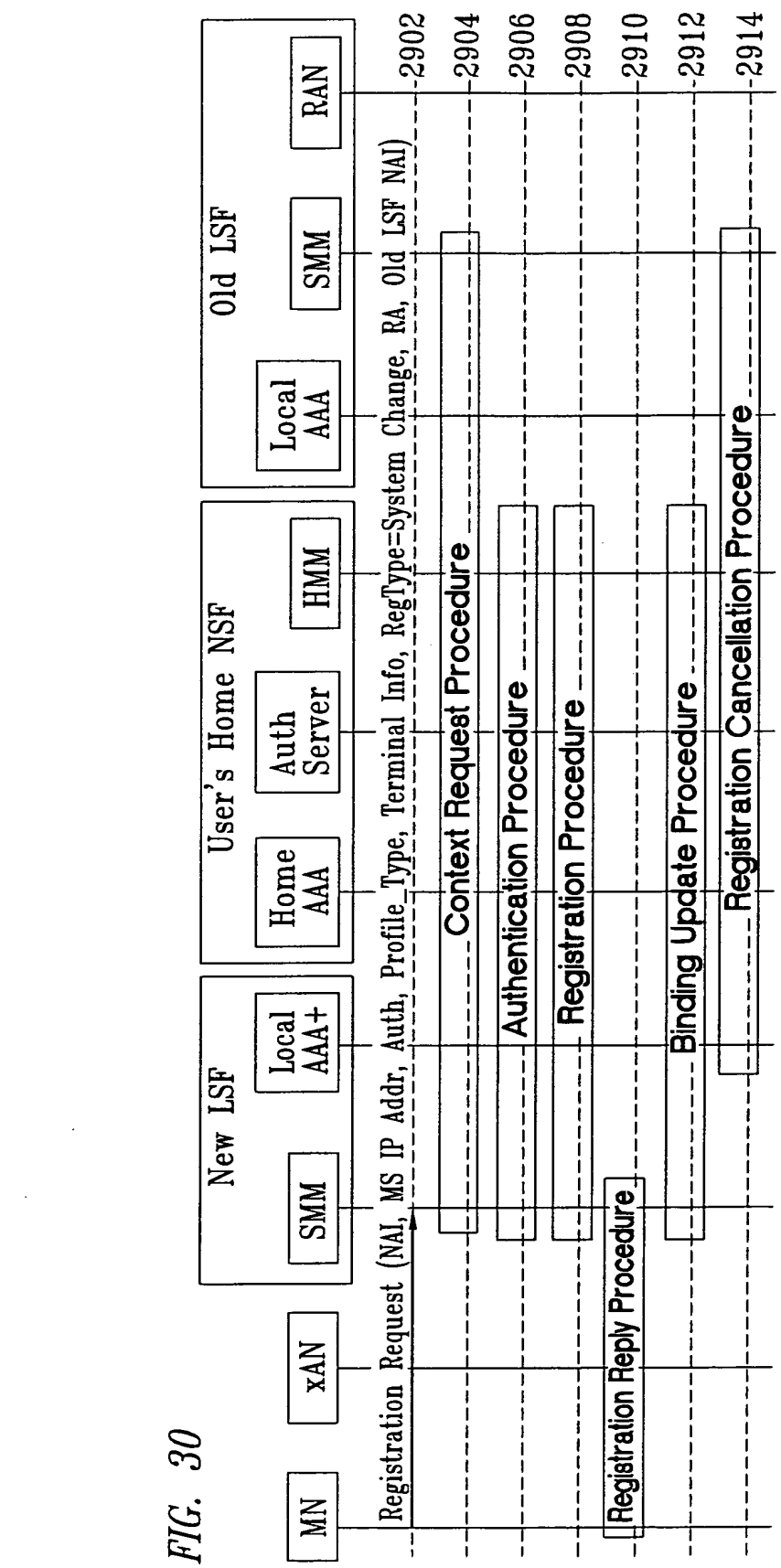

MN
xAN
New LSF
SMM
Local AAA+
User's Home NSF
Home AAA
Auth Server
HMM
Old LSF
Local AAA
SMM
RAN
Registration Request (NAI, MS IP Addr, Auth, Profile_Type, Terminal Info, RegType=System Change, RA, Old LSF NAI)
2902
Context Request Procedure
2904
Authentication Procedure
2906
Registration Procedure
2908
Registration Reply Procedure
2910
Binding Update Procedure
2912
Registration Cancellation Procedure
2914

FIG. 30

FIG. 31

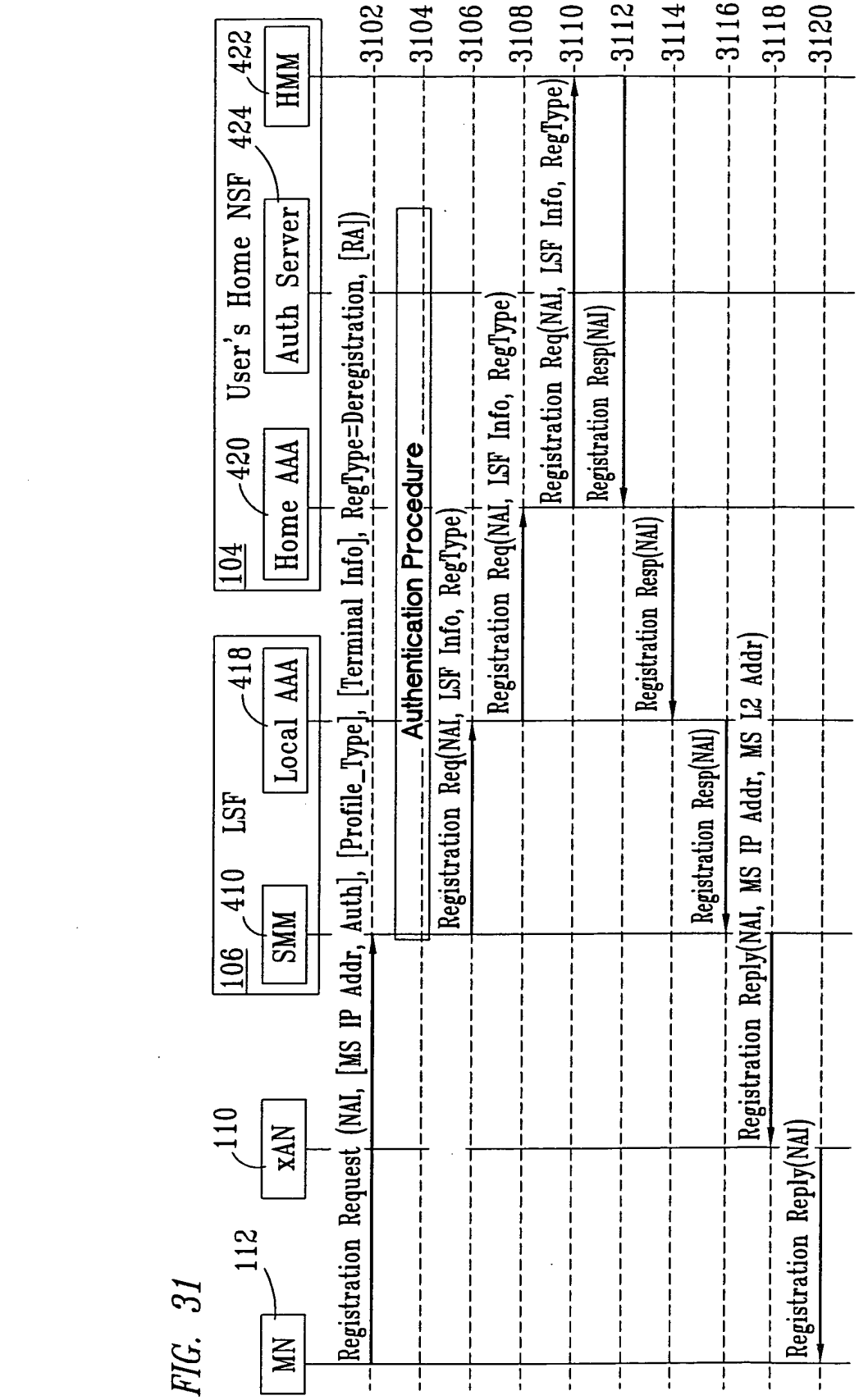
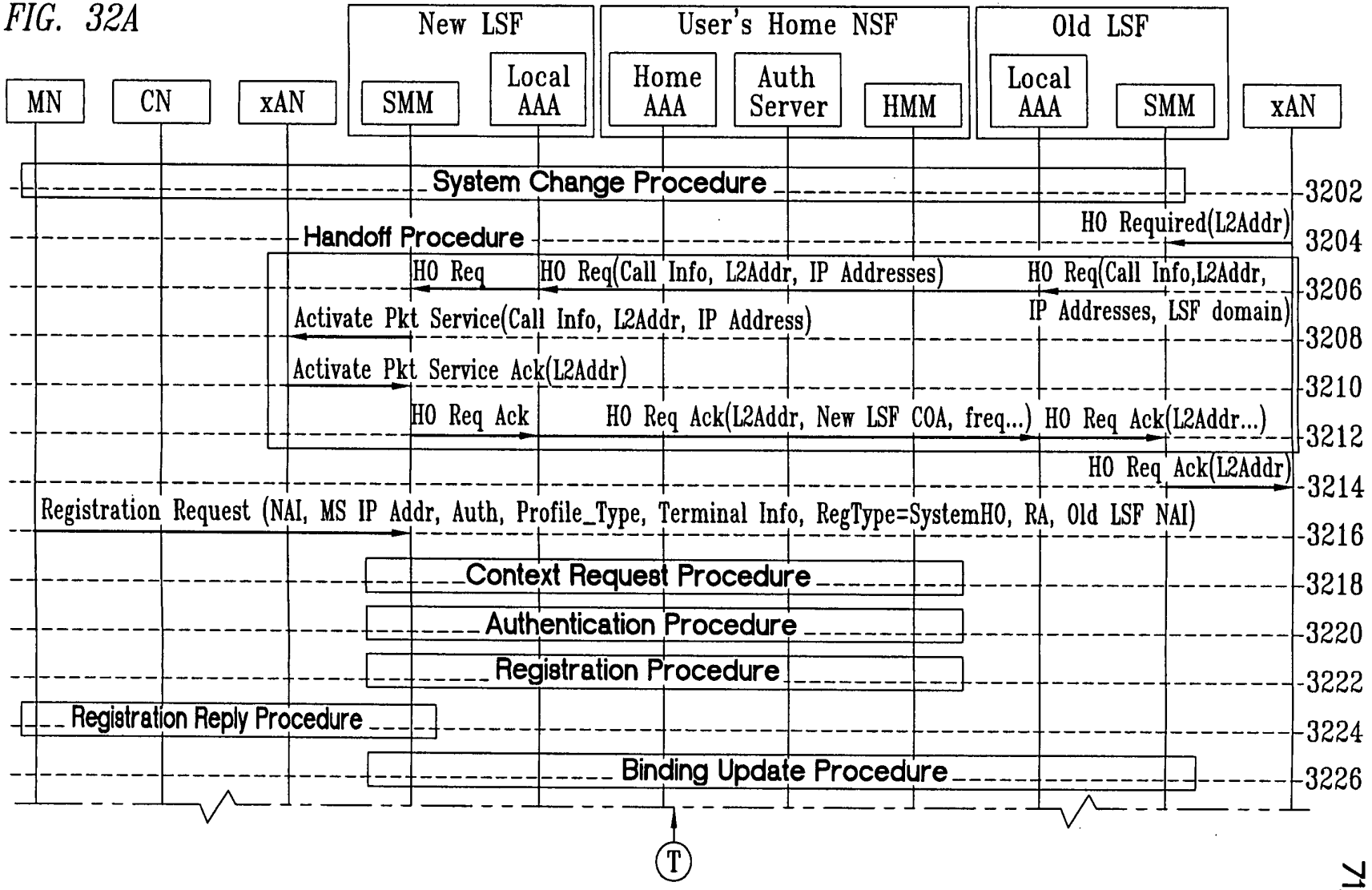

MN
112
xAN
110
SMM
106
410
LSF
Local AAA
418
104
420
Home AAA
User's Home NSF
424
Auth Server
HMM
422
3102
3104
3106
3108
3110
3112
3114
3116
3118
3120
Registration Request (NAI, [MS IP Addr, Auth], [Profile_Type], [Terminal Info], RegType=Deregistration, [RA])
Authentication Procedure
Registration Req(NAI, LSF Info, RegType)
Registration Req(NAI, LSF Info, RegType)
Registration Req(NAI, LSF Info, RegType)
Registration Resp(NAI)
Registration Resp(NAI)
Registration Resp(NAI)
Registration Reply(NAI, MS IP Addr, MS L2 Addr)
Registration Reply(NAI)

FIG. 32A


New LSF
User's Home NSF
Old LSF
MN
CN
xAN
SMM
Local AAA
Home AAA
Auth Server
HMM
Local AAA
SMM
xAN
System Change Procedure
3202
HO Required(L2Addr)
Handoff Procedure
3204
HO Req
HO Req(Call Info, L2Addr, IP Addresses)
HO Req(Call Info,L2Addr,
3206
IP Addresses, LSF domain)
Activate Pkt Service(Call Info, L2Addr, IP Address)
3208
Activate Pkt Service Ack(L2Addr)
3210
HO Req Ack
HO Req Ack(L2Addr, New LSF COA, freq...)
HO Req Ack(L2Addr...)
3212
HO Req Ack(L2Addr)
3214
Registration Request (NAI, MS IP Addr, Auth, Profile_Type, Terminal Info, RegType=SystemHO, RA, Old LSF NAI)
3216
Context Request Procedure
3218
Authentication Procedure
3220
Registration Procedure
3222
Registration Reply Procedure
3224
Binding Update Procedure
3226
T

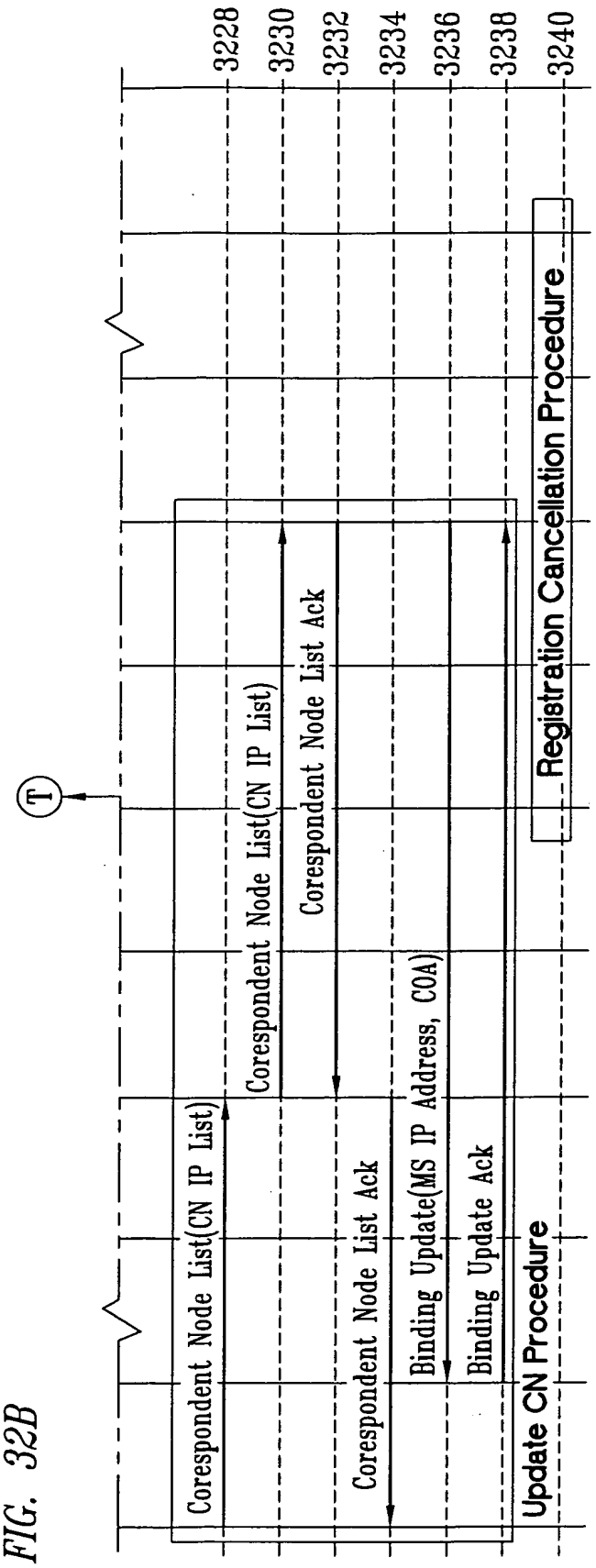
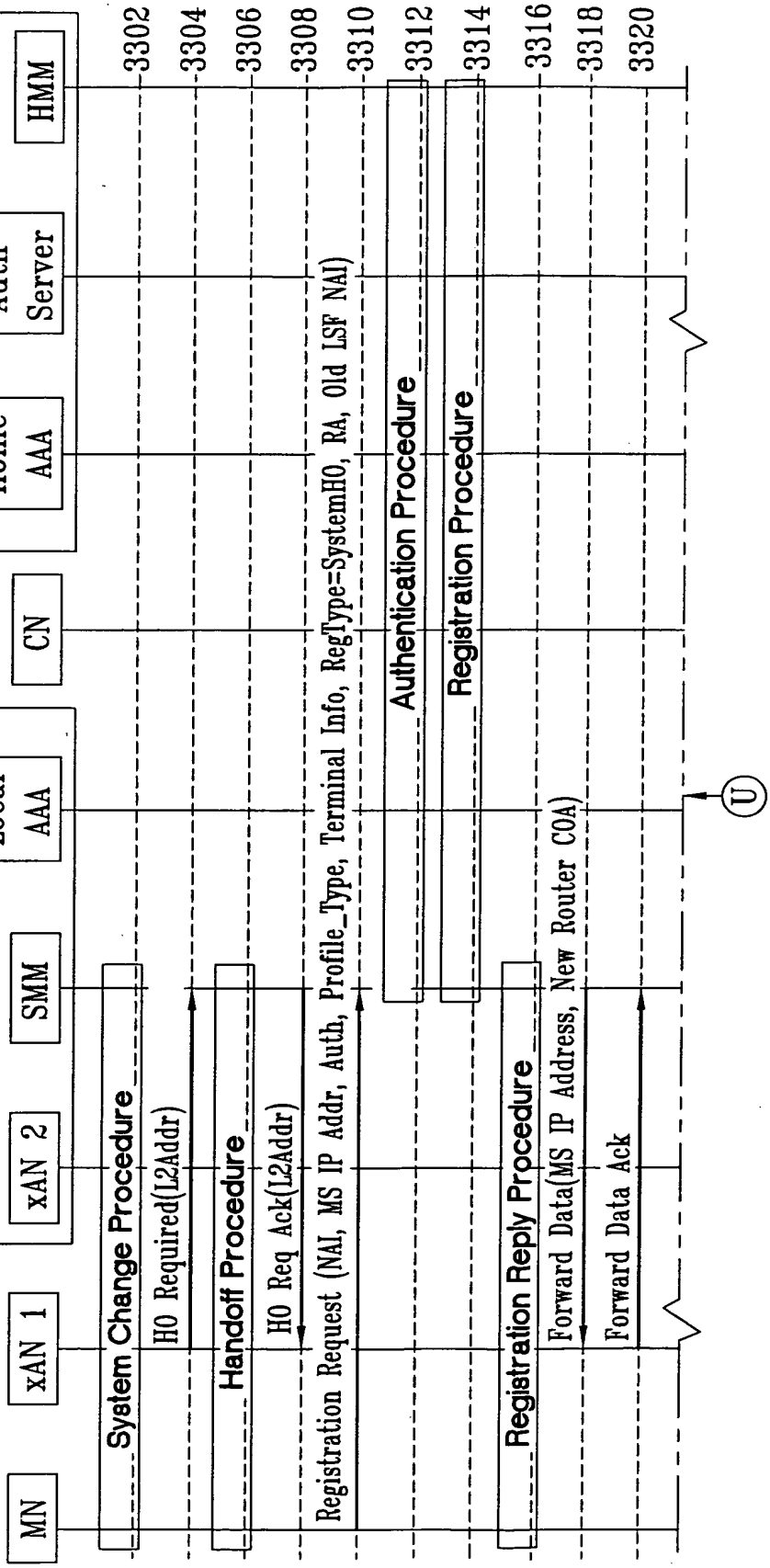

3228
3230
3232
3234
3236
3238
3240
T
Corespondent Node List(CN IP List)
Corespondent Node List(CN IP List)
Corespondent Node List Ack
Corespondent Node List Ack
Binding Update(MS IP Address, COA)
Binding Update Ack
Update CN Procedure
Registration Cancellation Procedure

FIG. 32B

FIG. 33A


MN
xAN 1
LSF
xAN 2
SMM
Local AAA
CN
User's Home NSF
Home AAA
Auth Server
HMM
3302
3304
3306
3308
3310
3312
3314
3316
3318
3320
System Change Procedure
HO Required(L2Addr)
Handoff Procedure
HO Req Ack(L2Addr)
Registration Request (NAI, MS IP Addr, Auth, Profile_Type, Terminal Info, RegType=SystemHO, RA, Old LSF NAI)
Authentication Procedure
Registration Procedure
Registration Reply Procedure
Forward Data(MS IP Address, New Router COA)
Forward Data Ack
U

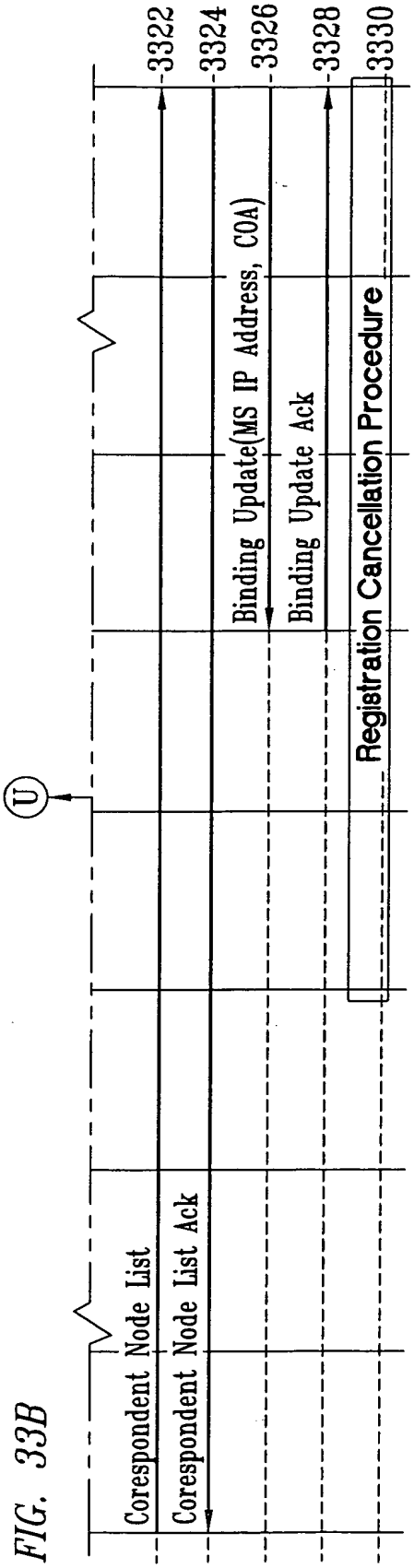

3322
3324
3326
3328
3330
Corespondent Node List
Corespondent Node List Ack
Binding Update(MS IP Address, COA)
Binding Update Ack
Registration Cancellation Procedure
U

FIG. 33B

FIG. 34

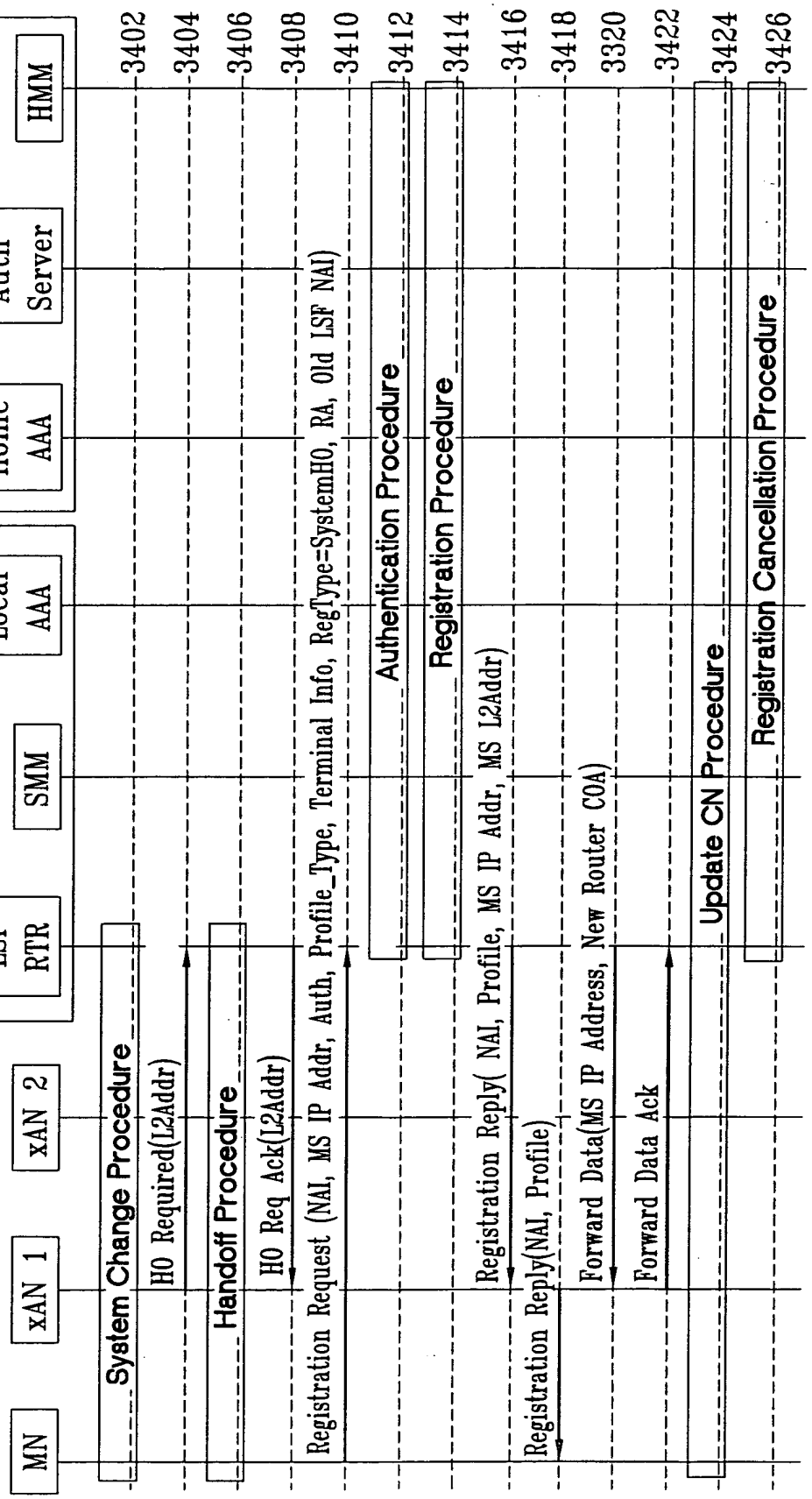
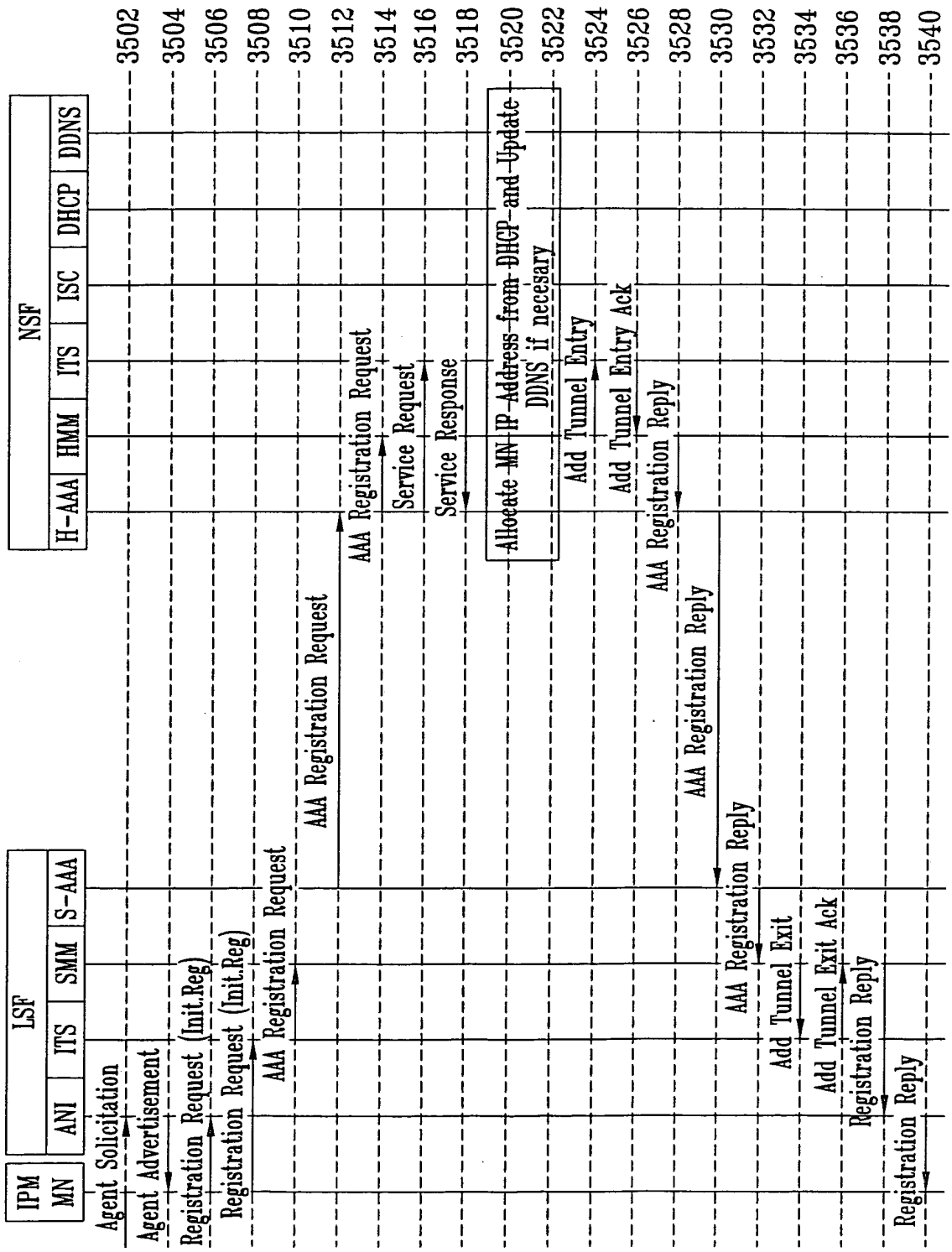

MN
xAN 1
xAN 2
LSF
LSF RTR
SMM
Local AAA
User's Home NSF
Home AAA
Auth Server
HMM
System Change Procedure
HO Required(L2Addr)
Handoff Procedure
HO Req Ack(L2Addr)
Registration Request (NAI, MS IP Addr, Auth, Profile_Type, Terminal Info, RegType=SystemHO, RA, Old LSF NAI)
Authentication Procedure
Registration Procedure
Registration Reply(NAI, Profile, MS IP Addr, MS L2Addr)
Registration Reply(NAI, Profile)
Forward Data(MS IP Address, New Router COA)
Forward Data Ack
Update CN Procedure
Registration Cancellation Procedure
3402
3404
3406
3408
3410
3412
3414
3416
3418
3320
3422
3424
3426

FIG. 35


IPM
MN
LSF
ANI
ITS
SMM
S-AAA
NSF
H-AAA
HMM
ITS
ISC
DHCP
DDNS
Agent Solicitation
Agent Advertisement
Registration Request (Init.Reg)
Registration Request (Init.Reg)
AAA Registration Request
AAA Registration Request
AAA Registration Request
Service Request
Service Response
Allocate MN IP Address from DHCP and Update DDNS if necessary
Add Tunnel Entry
Add Tunnel Entry Ack
AAA Registration Reply
AAA Registration Reply
AAA Registration Reply
Add Tunnel Exit
Add Tunnel Exit Ack
Registration Reply
Registration Reply
3502
3504
3506
3508
3510
3512
3514
3516
3518
3520
3522
3524
3526
3528
3530
3532
3534
3536
3538
3540

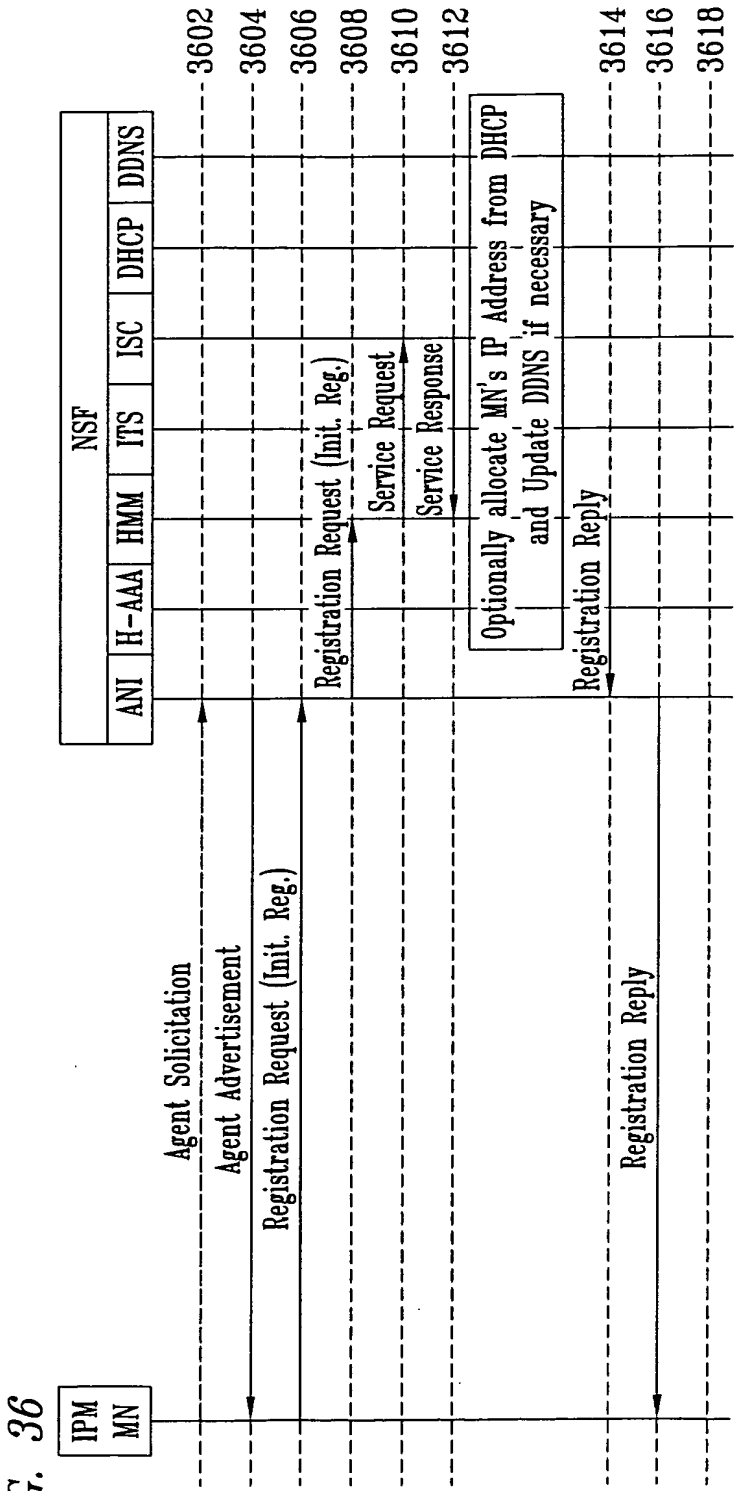

IPM MN
NSF
ANI
H-AAA
HMM
ITS
ISC
DHCP
DDNS
Agent Solicitation
Agent Advertisement
Registration Request (Init. Reg.)
Registration Request (Init. Reg.)
Service Request
Service Response
Optionally allocate MN's IP Address from DHCP and Update DDNS if necessary
Registration Reply
Registration Reply
3602
3604
3606
3608
3610
3612
3614
3616
3618

FIG. 36

FIG. 37

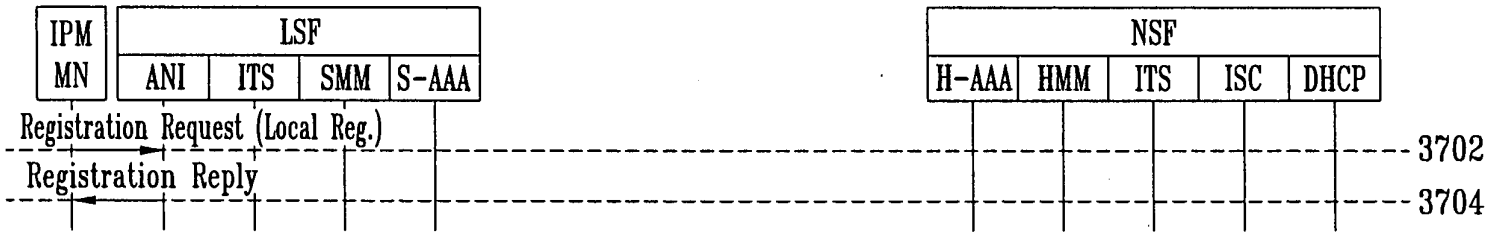
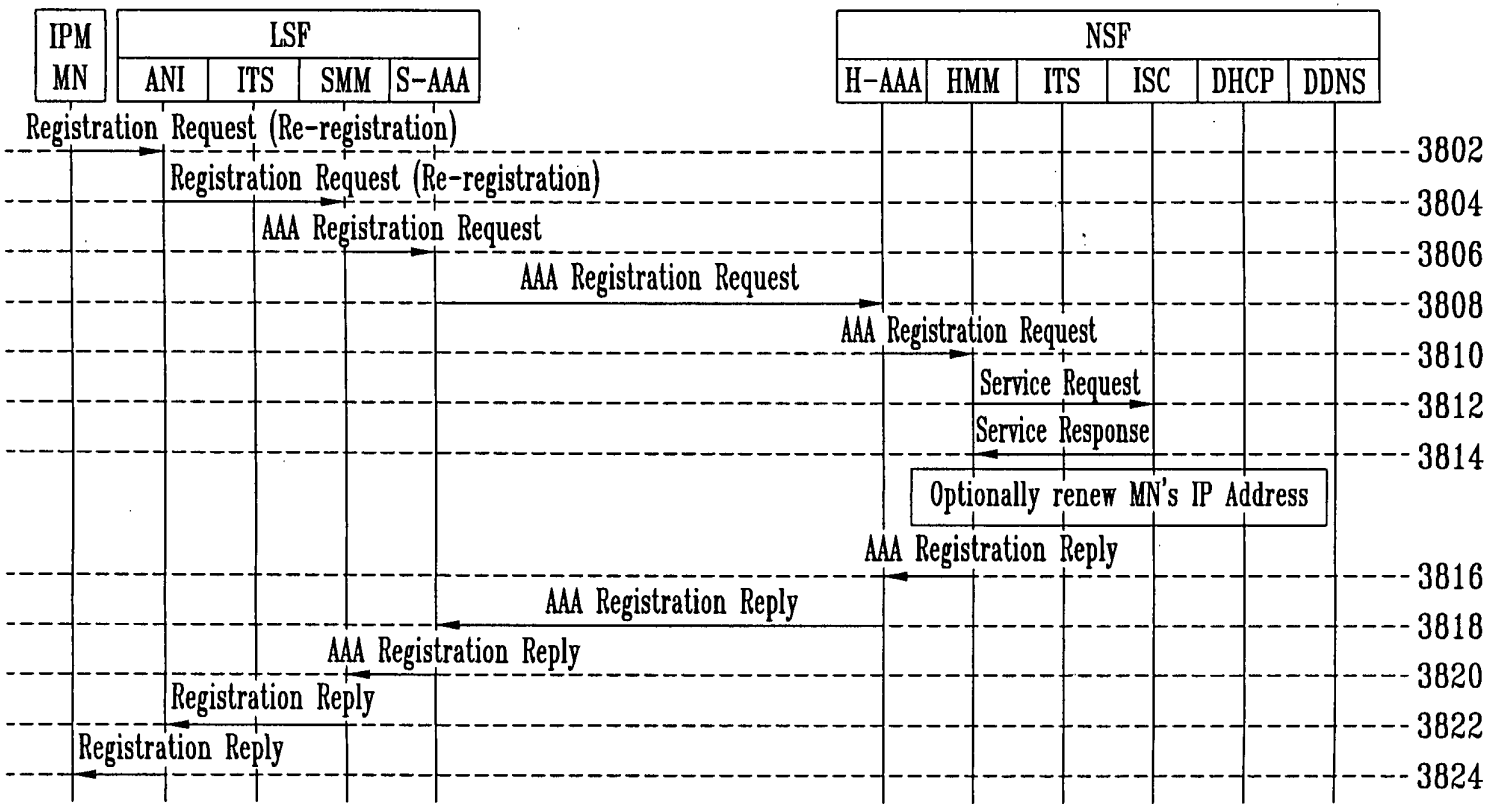

IPM
MN
LSF
ANI
ITS
SMM
S-AAA
NSF
H-AAA
HMM
ITS
ISC
DHCP
Registration Request (Local Reg.)
Registration Reply
3702
3704

FIG. 38


IPM
MN
LSF
ANI
ITS
SMM
S-AAA
NSF
H-AAA
HMM
ITS
ISC
DHCP
DDNS
Registration Request (Re-registration)
Registration Request (Re-registration)
AAA Registration Request
AAA Registration Request
AAA Registration Request
Service Request
Service Response
Optionally renew MN's IP Address
AAA Registration Reply
AAA Registration Reply
AAA Registration Reply
Registration Reply
Registration Reply
3802
3804
3806
3808
3810
3812
3814
3816
3818
3820
3822
3824

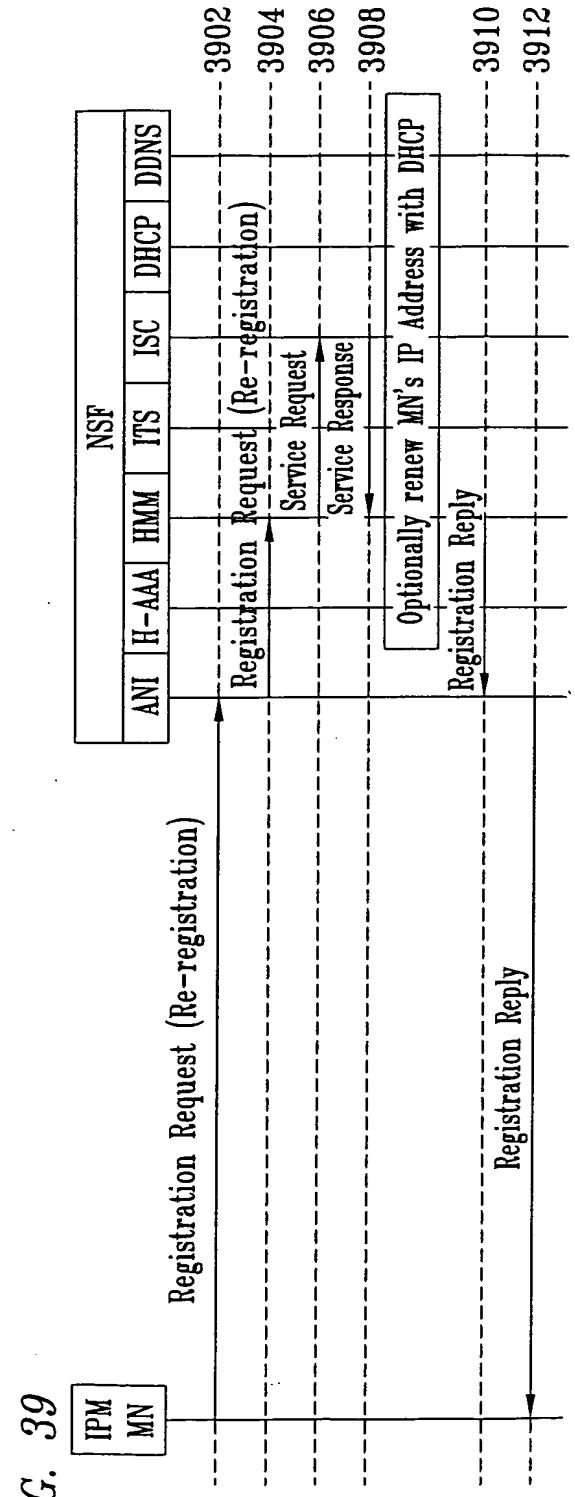
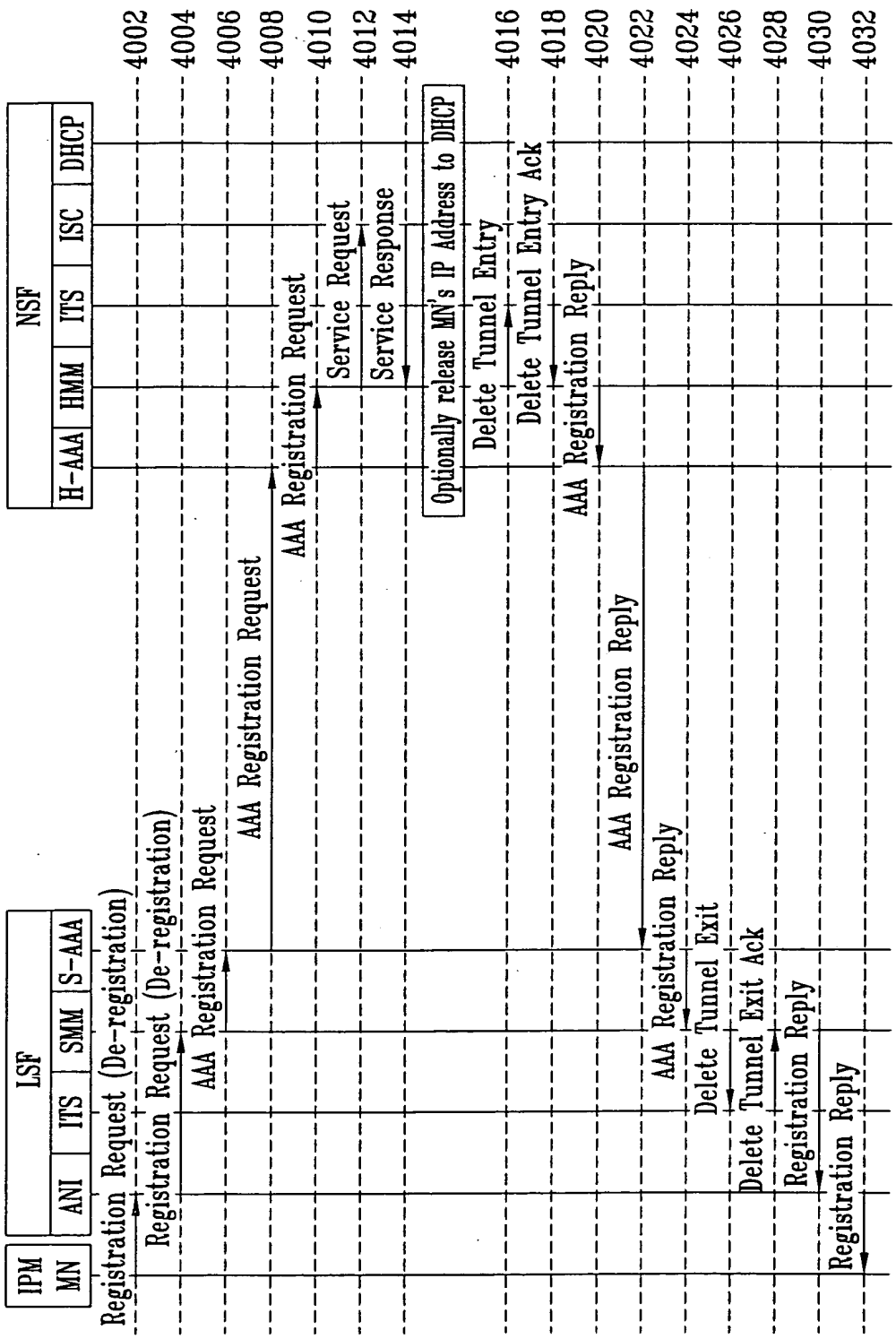

IPM
MN
NSF
ANI
H-AAA
HMM
ITS
ISC
DHCP
DDNS
Registration Request (Re-registration)
Registration Request (Re-registration)
Service Request
Service Response
Optionally renew MN's IP Address with DHCP
Registration Reply
Registration Reply
3902
3904
3906
3908
3910
3912

FIG. 39

FIG. 40


IPM MN
LSF
ANI
ITS
SMM
S-AAA
NSF
H-AAA
HMM
ITS
ISC
DHCP
Registration Request (De-registration)
Registration Request (De-registration)
AAA Registration Request
AAA Registration Request
AAA Registration Request
Service Request
Service Response
Optionally release MN's IP Address to DHCP
Delete Tunnel Entry
Delete Tunnel Entry Ack
AAA Registration Reply
AAA Registration Reply
AAA Registration Reply
Delete Tunnel Exit
Delete Tunnel Exit Ack
Registration Reply
Registration Reply
4002
4004
4006
4008
4010
4012
4014
4016
4018
4020
4022
4024
4026
4028
4030
4032

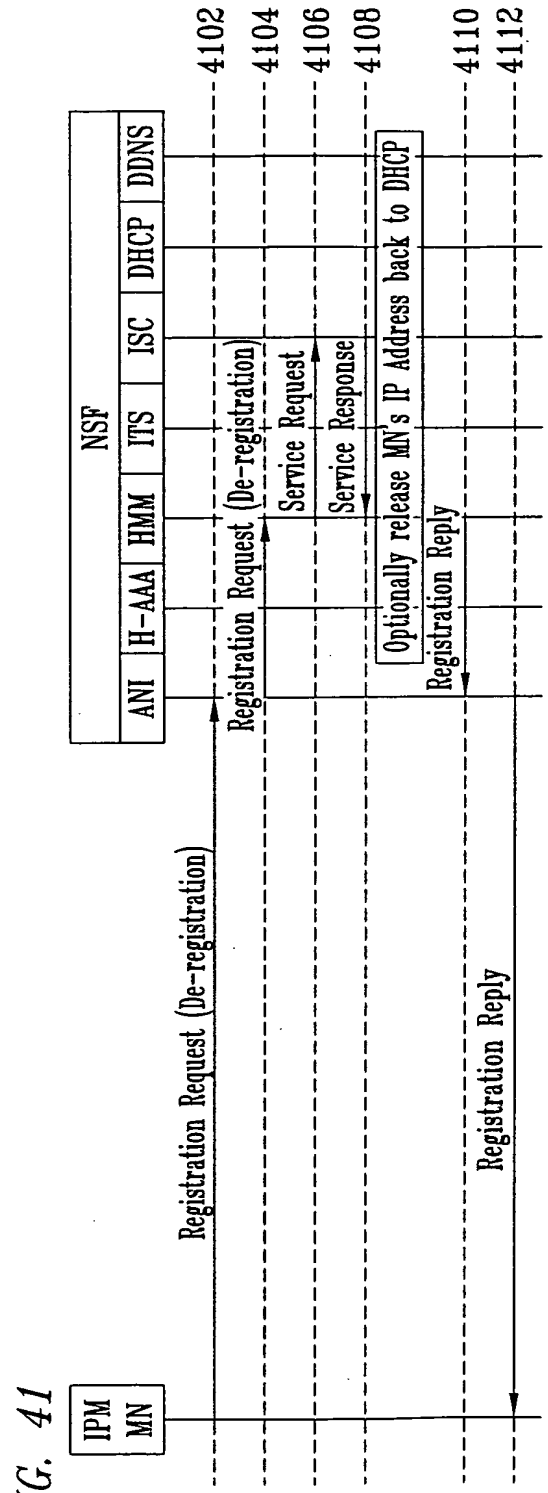

IPM MN
NSF
ANI
H-AAA
HMM
ITS
ISC
DHCP
DDNS
4102
4104
4106
4108
4110
4112
Registration Request (De-registration)
Registration Request (De-registration)
Service Request
Service Response
Optionally release MN's IP Address back to DHCP
Registration Reply
Registration Reply

FIG. 41

FIG. 42

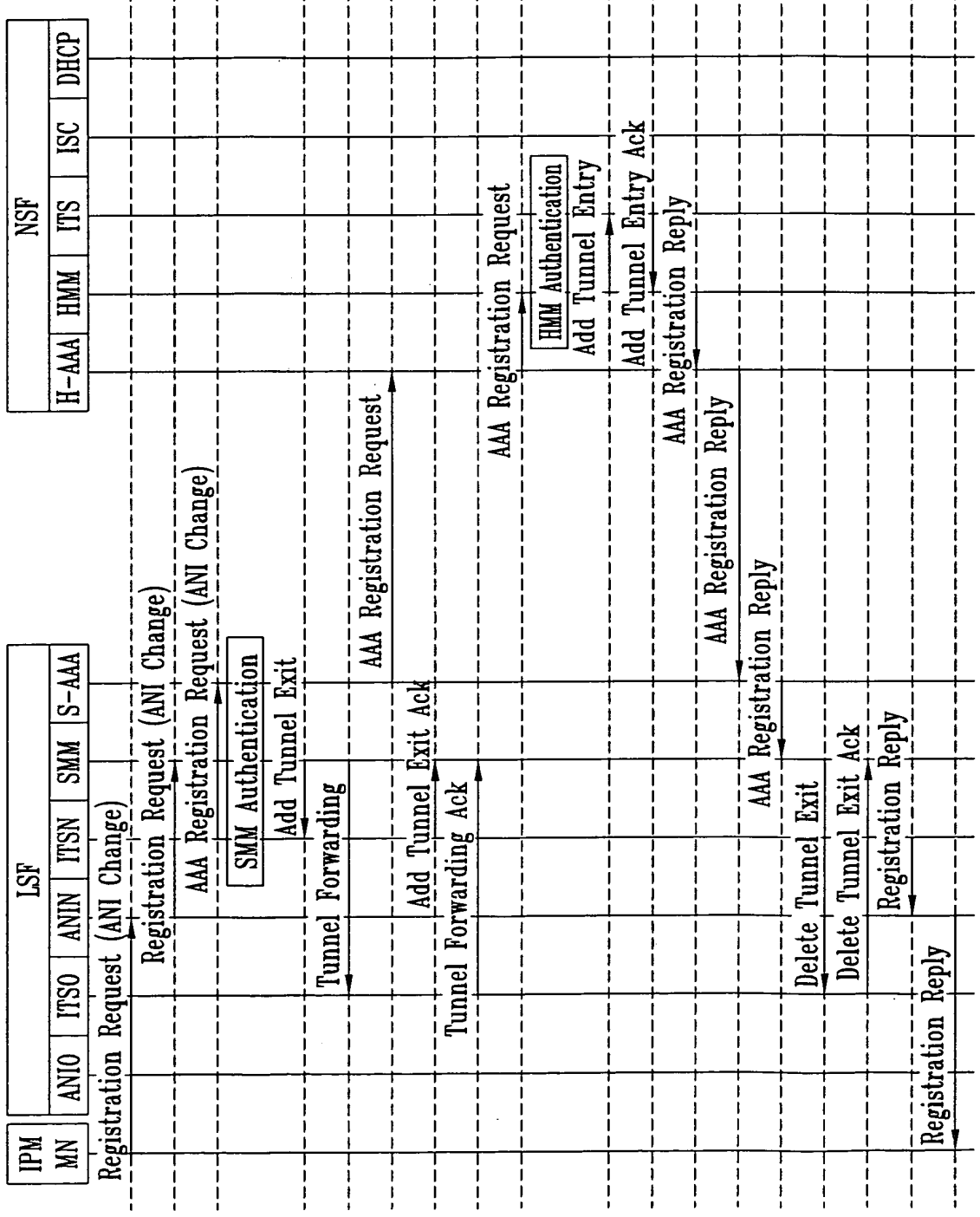
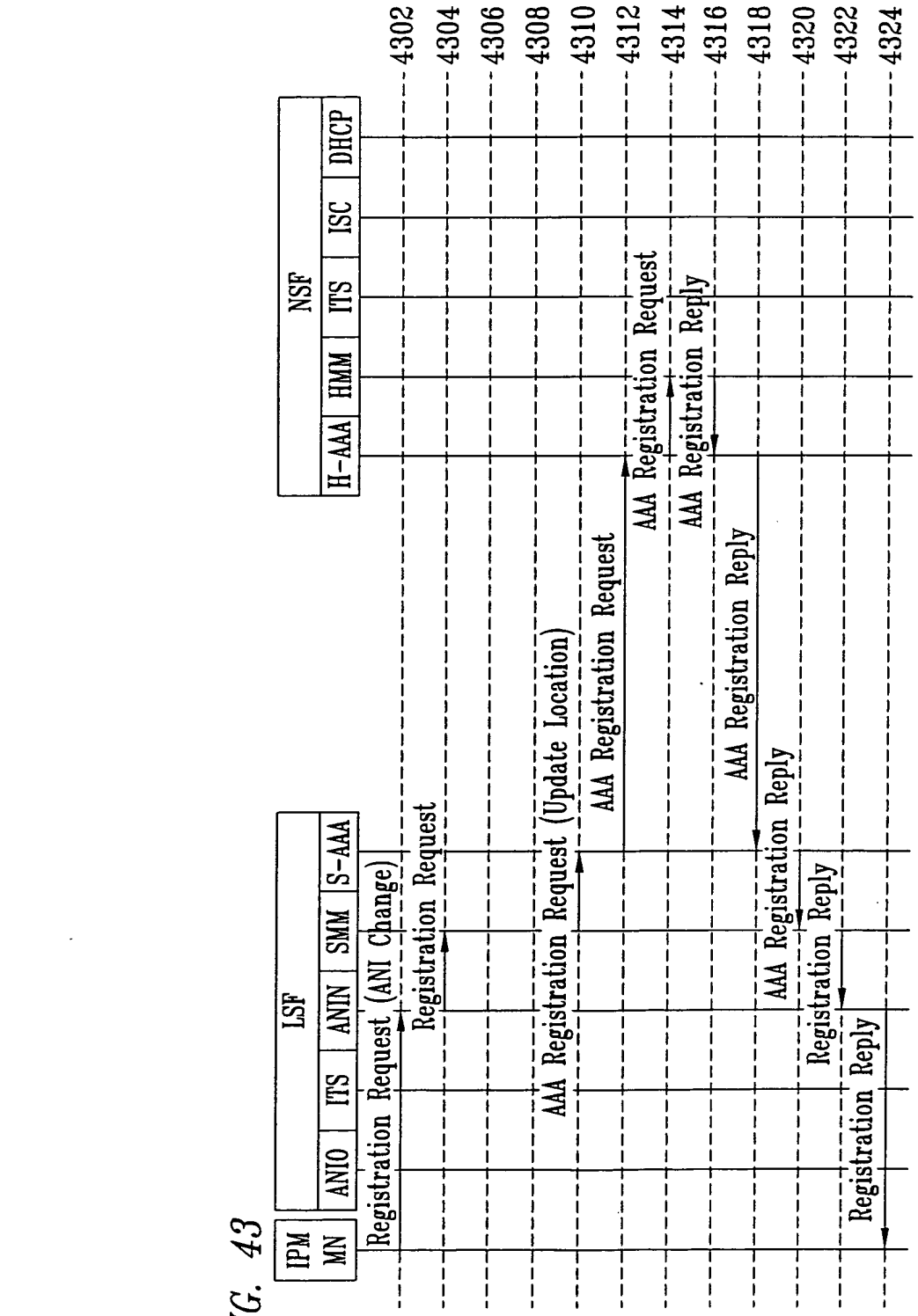

IPM MN
LSF
ANIO
ITSO
ANIN
ITSN
SMM
S-AAA
NSF
H-AAA
HMM
ITS
ISC
DHCP
Registration Request (ANI Change)
Registration Request (ANI Change)
AAA Registration Request (ANI Change)
SMM Authentication
Add Tunnel Exit
Tunnel Forwarding
AAA Registration Request
Add Tunnel Exit Ack
Tunnel Forwarding Ack
AAA Registration Request
HMM Authentication
Add Tunnel Entry
Add Tunnel Entry Ack
AAA Registration Reply
AAA Registration Reply
AAA Registration Reply
Delete Tunnel Exit
Delete Tunnel Exit Ack
Registration Reply
Registration Reply
4202
4204
4206
4208
4210
4212
4214
4216
4218
4220
4222
4224
4226
4228
4230
4232
4234
4236

FIG. 43



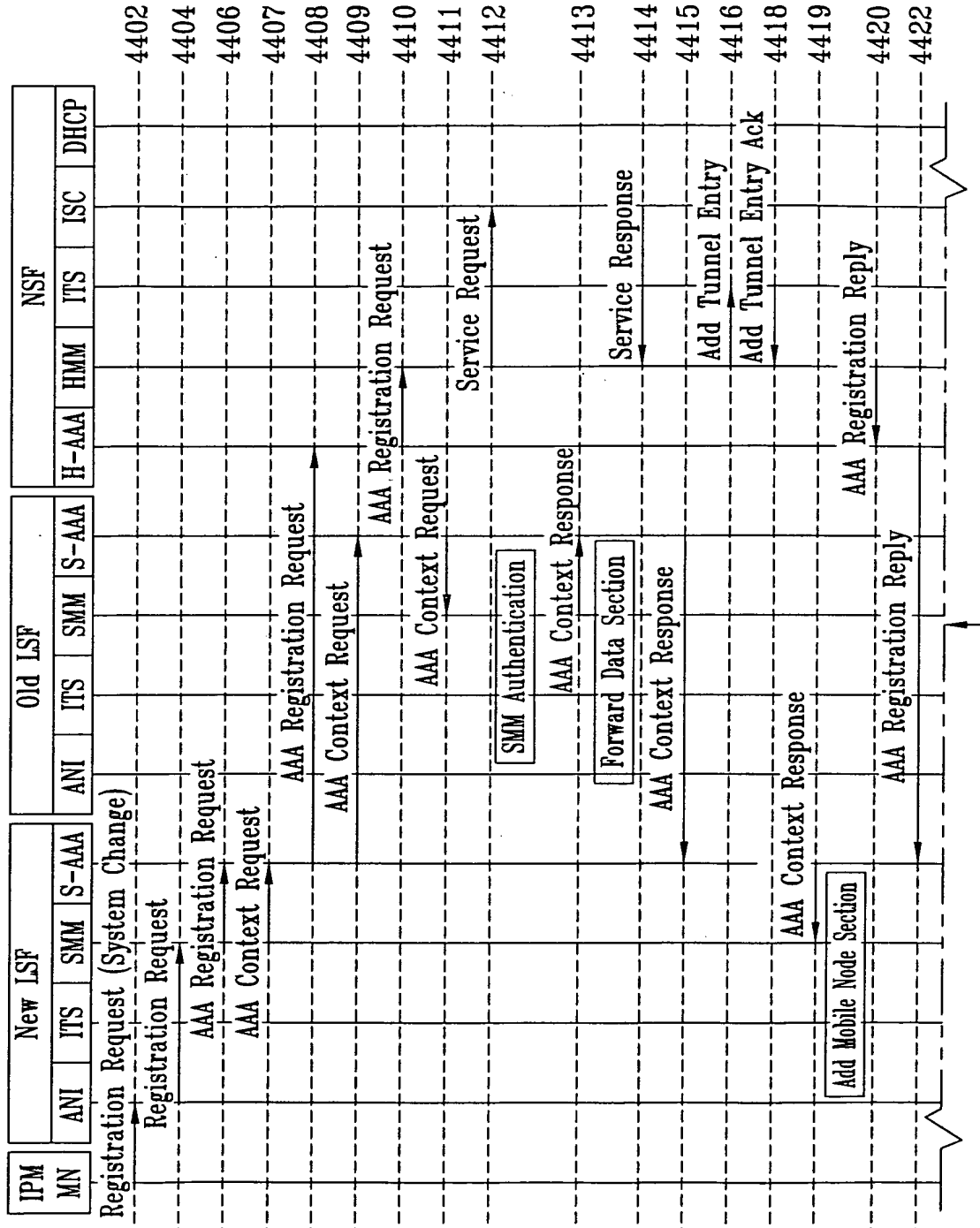

IPM
MN
New LSF
ANI
ITS
SMM
S-AAA
Old LSF
ANI
ITS
SMM
S-AAA
NSF
H-AAA
HMM
ITS
ISC
DHCP
Registration Request (System Change)
Registration Request
AAA Registration Request
AAA Context Request
AAA Registration Request
AAA Context Request
AAA Registration Request
AAA Context Request
SMM Authentication
AAA Context Response
Forward Data Section
Service Response
AAA Context Response
Service Request
Add Tunnel Entry
Add Tunnel Entry Ack
AAA Context Response
AAA Registration Reply
Add Mobile Node Section
AAA Registration Reply
4402
4404
4406
4407
4408
4409
4410
4411
4412
4413
4414
4415
4416
4418
4419
4420
4422
V

FIG. 44A

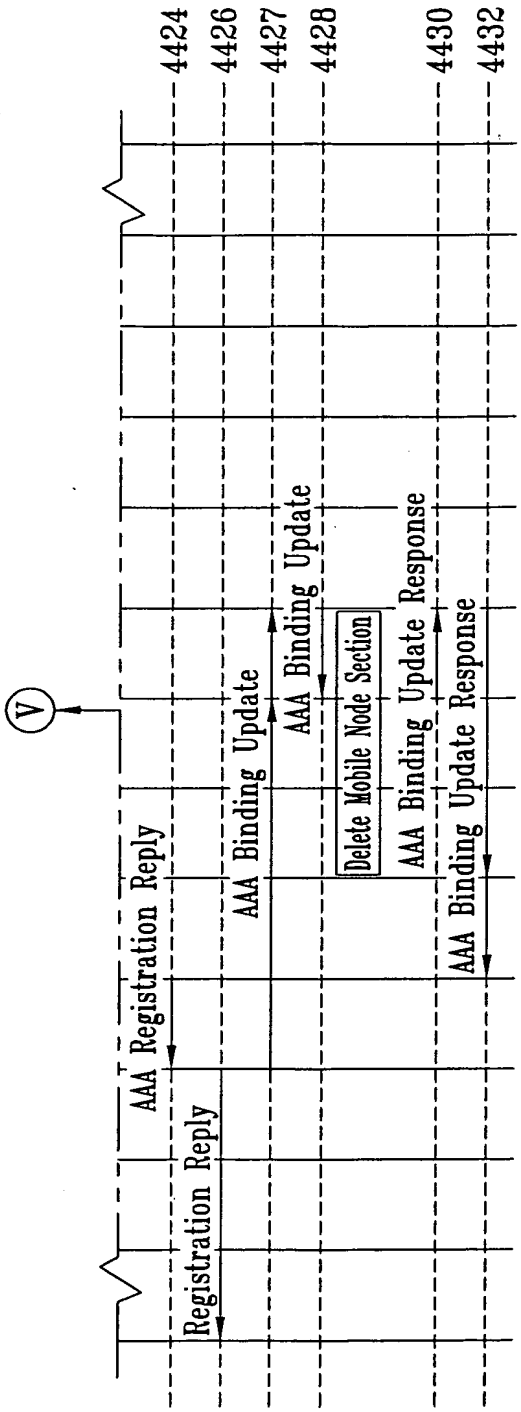

4424
4426
4427
4428
4430
4432
V
AAA Registration Reply
Registration Reply
AAA Binding Update
AAA Binding Update
Delete Mobile Node Section
AAA Binding Update Response
AAA Binding Update Response

FIG. 44B

FIG. 45

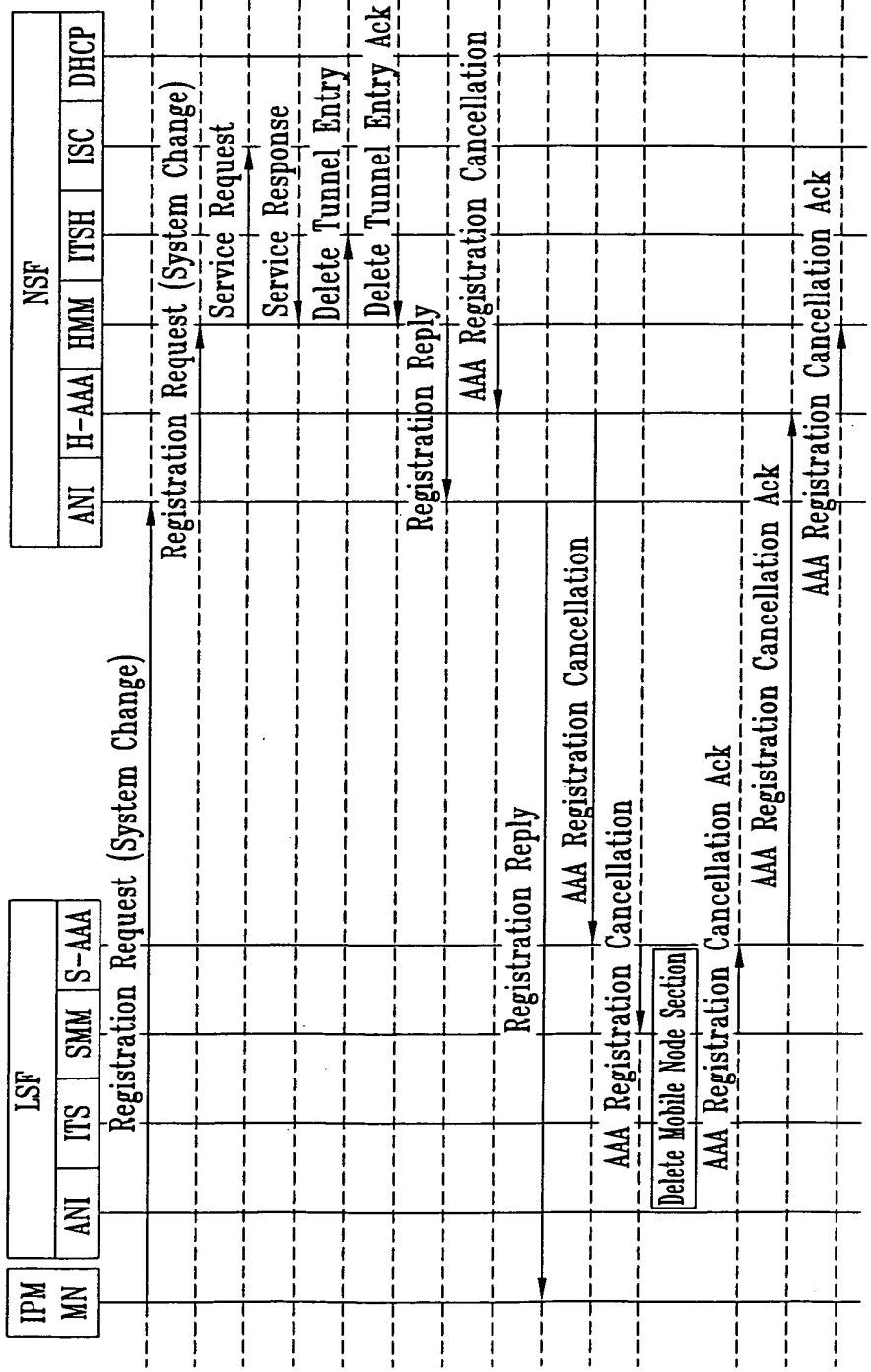
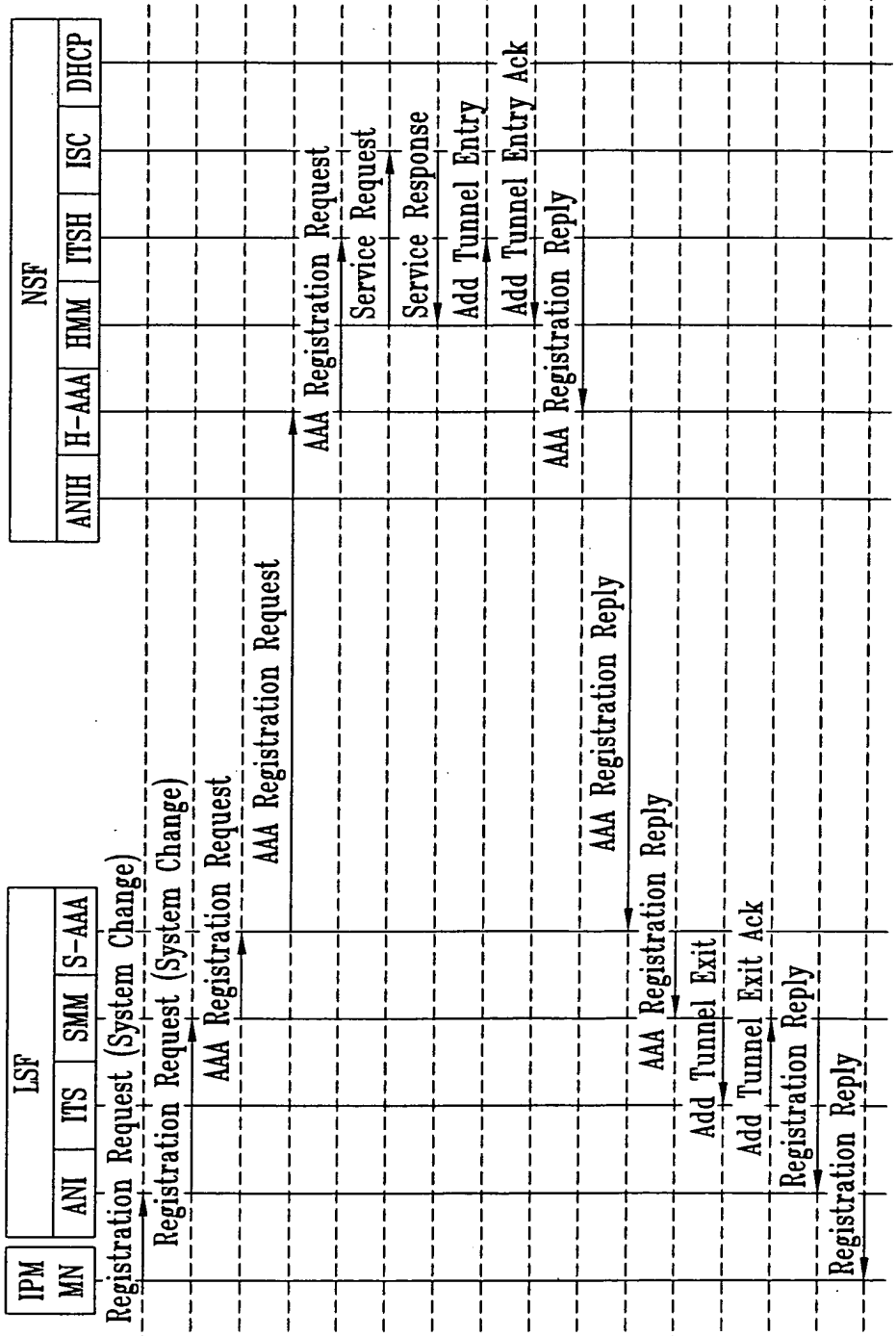

IPM
MN
LSF
ANI
ITS
SMM
S-AAA
NSF
ANI
H-AAA
HMM
ITSH
ISC
DHCP
Registration Request (System Change)
Registration Request (System Change)
Service Request
Service Response
Delete Tunnel Entry
Delete Tunnel Entry Ack
Registration Reply
AAA Registration Cancellation
Registration Reply
AAA Registration Cancellation
AAA Registration Cancellation
Delete Mobile Node Section
AAA Registration Cancellation Ack
AAA Registration Cancellation Ack
AAA Registration Cancellation Ack
4502
4504
4506
4508
4510
4512
4514
4515
4516
4517
4518
4520
4522
4524

FIG. 46


IPM
MN
LSF
ANI
ITS
SMM
S-AAA
NSF
ANIH
H-AAA
HMM
ITSH
ISC
DHCP
Registration Request (System Change)
Registration Request (System Change)
AAA Registration Request
AAA Registration Request
AAA Registration Request
Service Request
Service Response
Add Tunnel Entry
Add Tunnel Entry Ack
AAA Registration Reply
AAA Registration Reply
AAA Registration Reply
Add Tunnel Exit
Add Tunnel Exit Ack
Registration Reply
Registration Reply
4602
4604
4606
4608
4610
4612
4614
4616
4618
4620
4622
4624
4626
4628
4630
4632

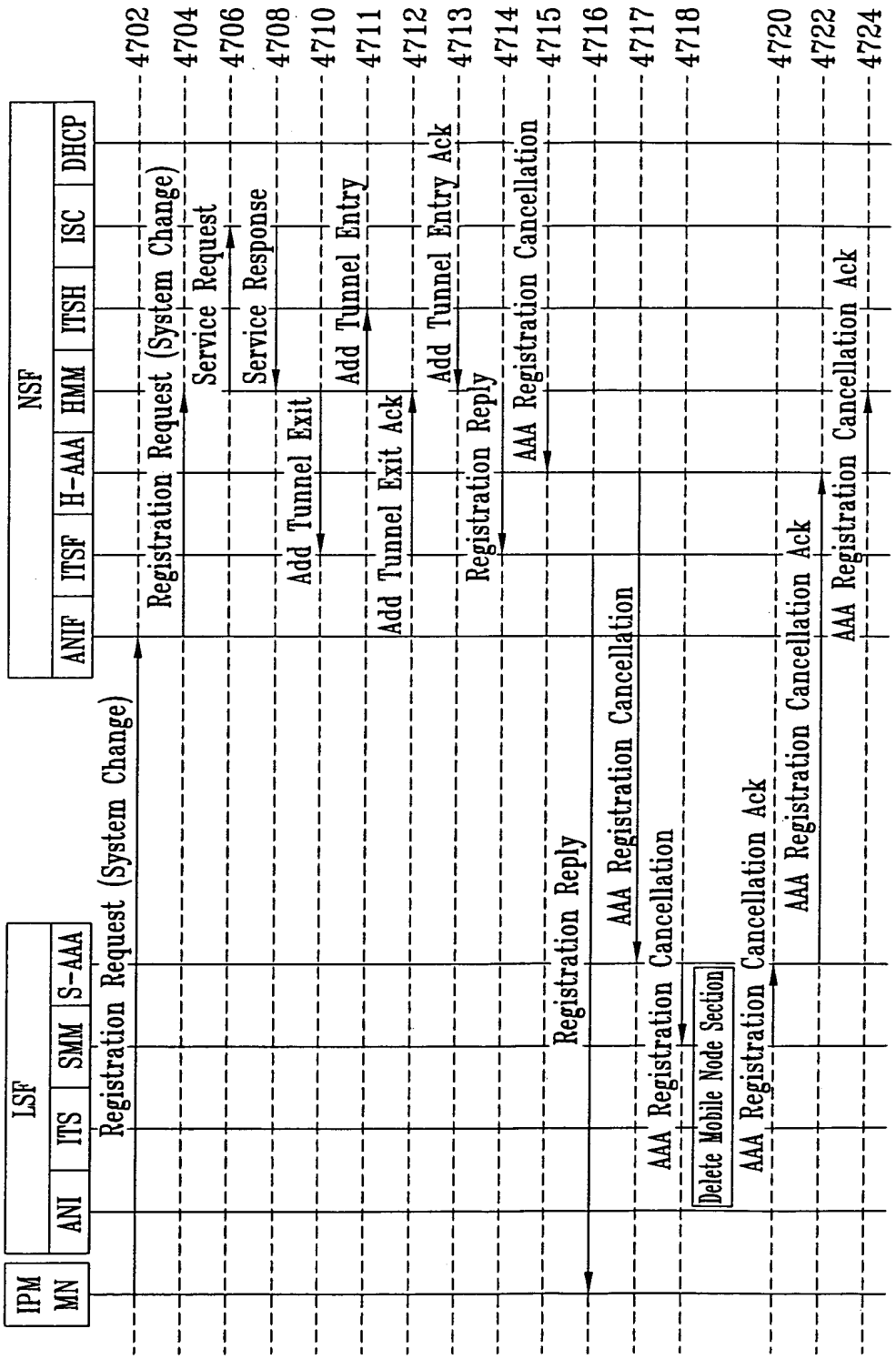
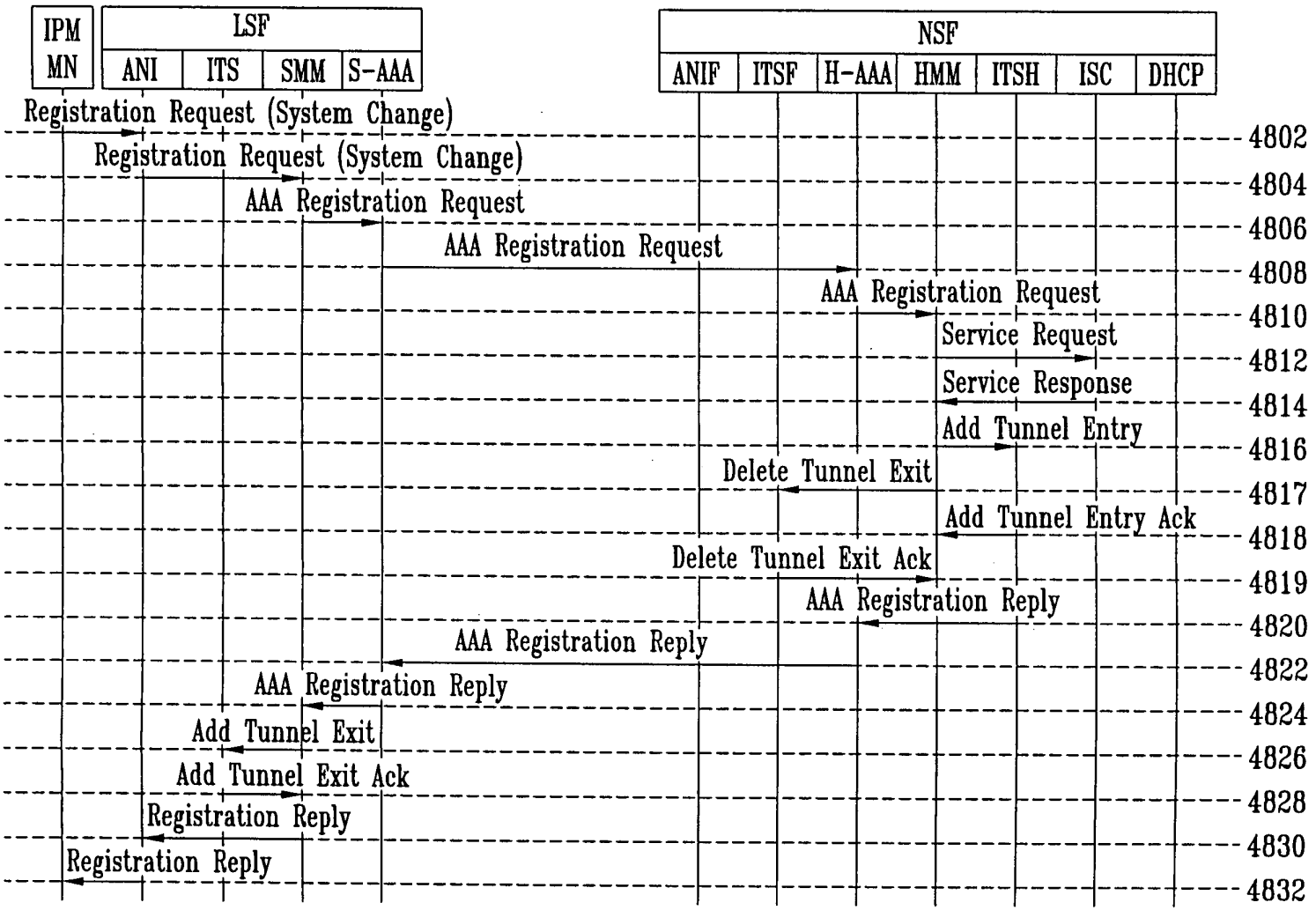

IPM
MN
LSF
ANI
ITS
SMM
S-AAA
NSF
ANIF
ITSF
H-AAA
HMM
ITSH
ISC
DHCP
Registration Request (System Change)
Registration Request (System Change)
Service Request
Service Response
Add Tunnel Exit
Add Tunnel Entry
Add Tunnel Exit Ack
Add Tunnel Entry Ack
Registration Reply
AAA Registration Cancellation
Registration Reply
AAA Registration Cancellation
AAA Registration Cancellation
Delete Mobile Node Section
AAA Registration Cancellation Ack
AAA Registration Cancellation Ack
AAA Registration Cancellation Ack
4702
4704
4706
4708
4710
4711
4712
4713
4714
4715
4716
4717
4718
4720
4722
4724

FIG. 47

FIG. 48


IPM
MN
LSF
ANI
ITS
SMM
S-AAA
NSF
ANIF
ITSF
H-AAA
HMM
ITSH
ISC
DHCP
Registration Request (System Change)
Registration Request (System Change)
AAA Registration Request
AAA Registration Request
AAA Registration Request
Service Request
Service Response
Add Tunnel Entry
Delete Tunnel Exit
Add Tunnel Entry Ack
Delete Tunnel Exit Ack
AAA Registration Reply
AAA Registration Reply
AAA Registration Reply
Add Tunnel Exit
Add Tunnel Exit Ack
Registration Reply
Registration Reply
4802
4804
4806
4808
4810
4812
4814
4816
4817
4818
4819
4820
4822
4824
4826
4828
4830
4832

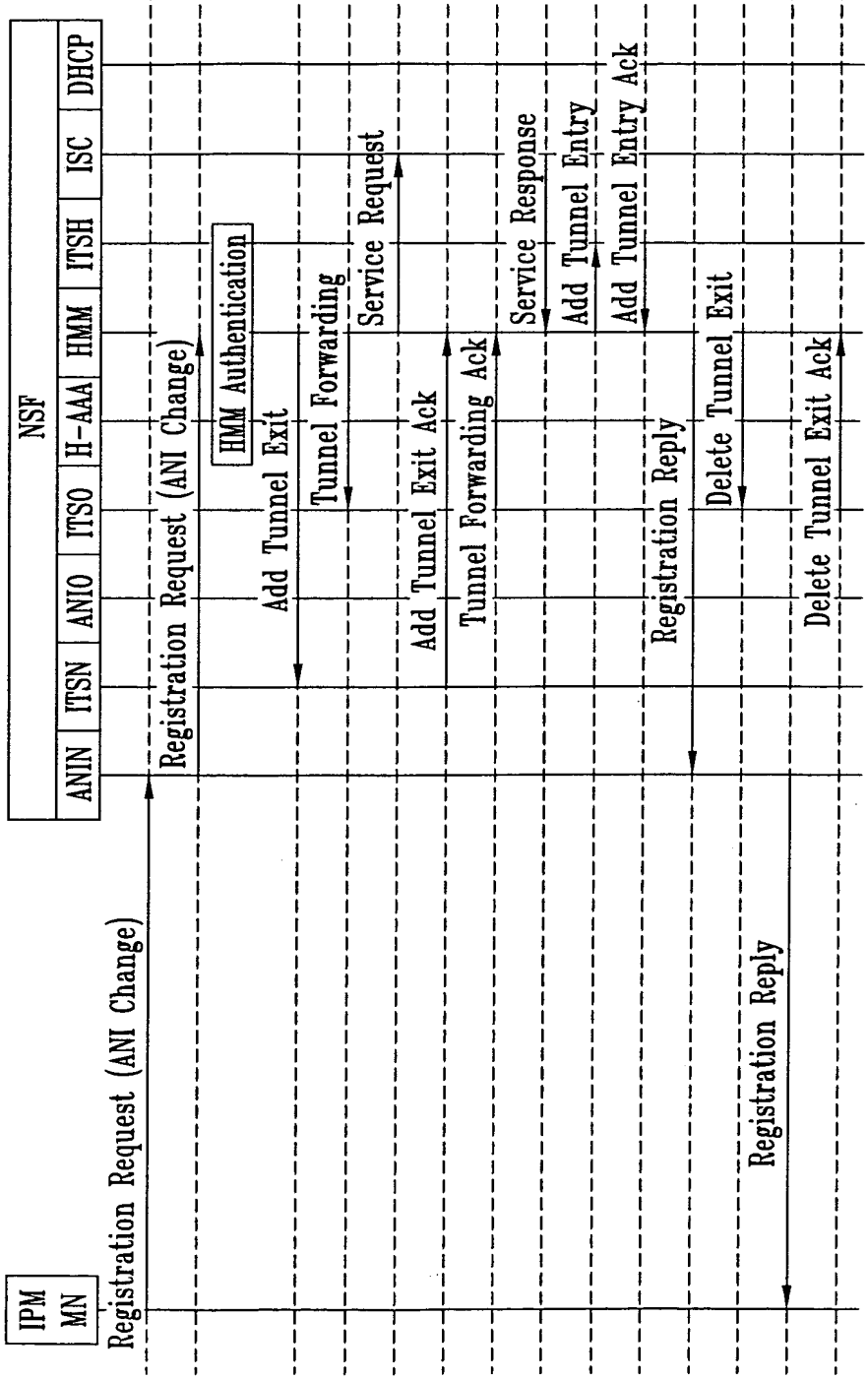

IPM
MN
NSF
ANIN
ITSN
ANIO
ITSO
H-AAA
HMM
ITSH
ISC
DHCP
Registration Request (ANI Change)
Registration Request (ANI Change)
HMM Authentication
Add Tunnel Exit
Tunnel Forwarding
Service Request
Add Tunnel Exit Ack
Tunnel Forwarding Ack
Service Response
Add Tunnel Entry
Add Tunnel Entry Ack
Registration Reply
Delete Tunnel Exit
Registration Reply
Delete Tunnel Exit Ack
4902
4904
4906
4908
4910
4912
4914
4916
4918
4920
4922
4924
4926
4928

FIG. 49

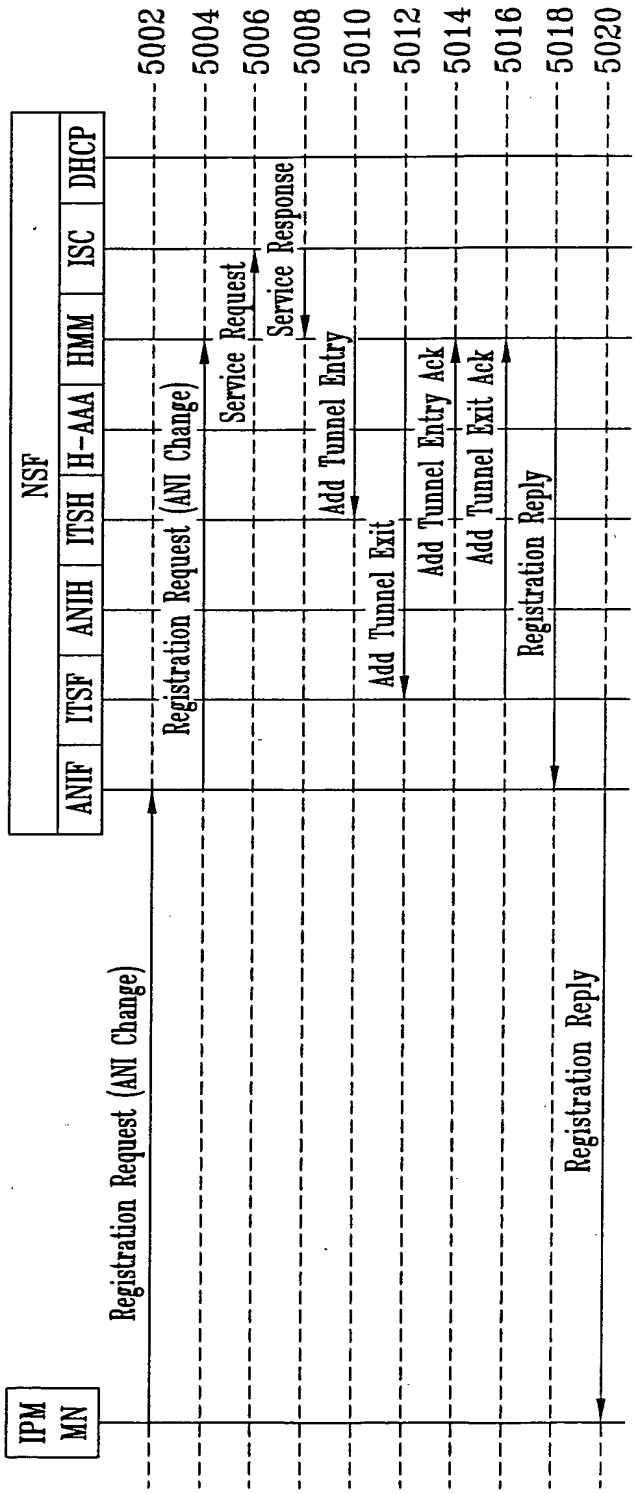

IPM MN
NSF
ANIF
ITSF
ANIH
ITSH
H-AAA
HMM
ISC
DHCP
Registration Request (ANI Change)
Registration Request (ANI Change)
Service Request
Service Response
Add Tunnel Entry
Add Tunnel Exit
Add Tunnel Entry Ack
Add Tunnel Exit Ack
Registration Reply
Registration Reply
5002
5004
5006
5008
5010
5012
5014
5016
5018
5020

FIG. 50

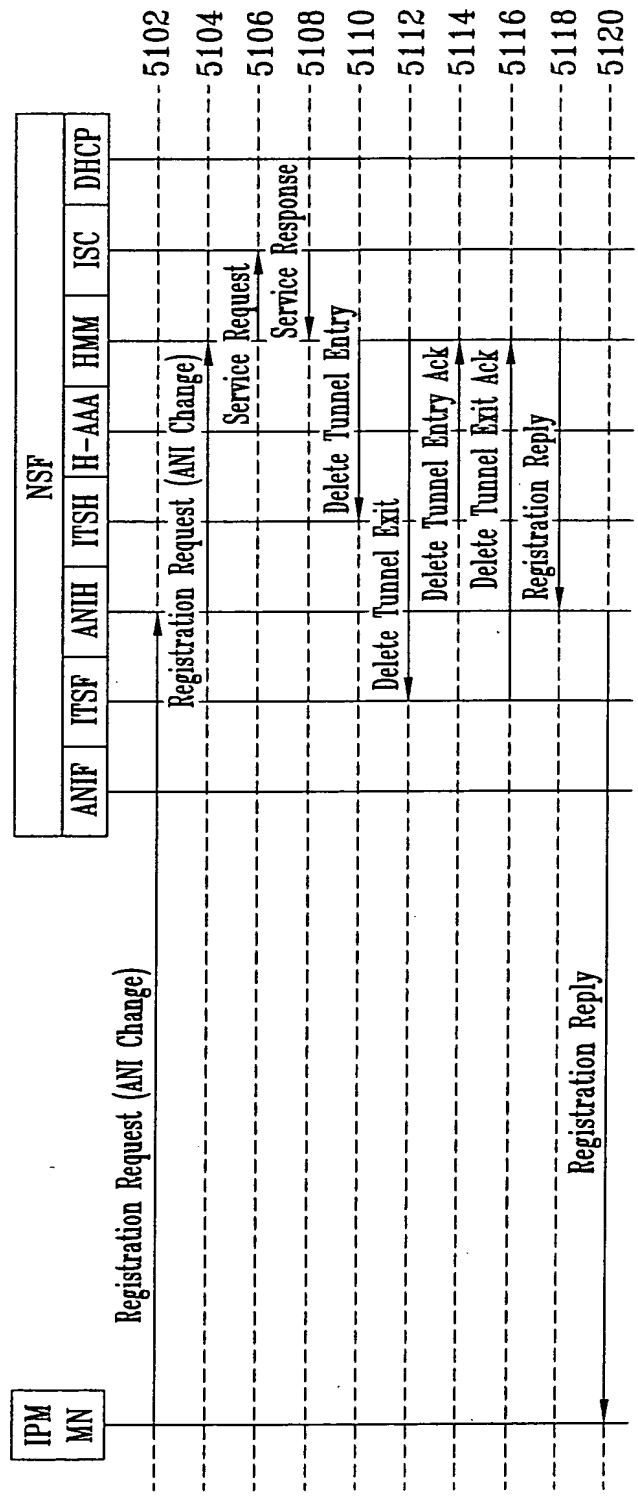
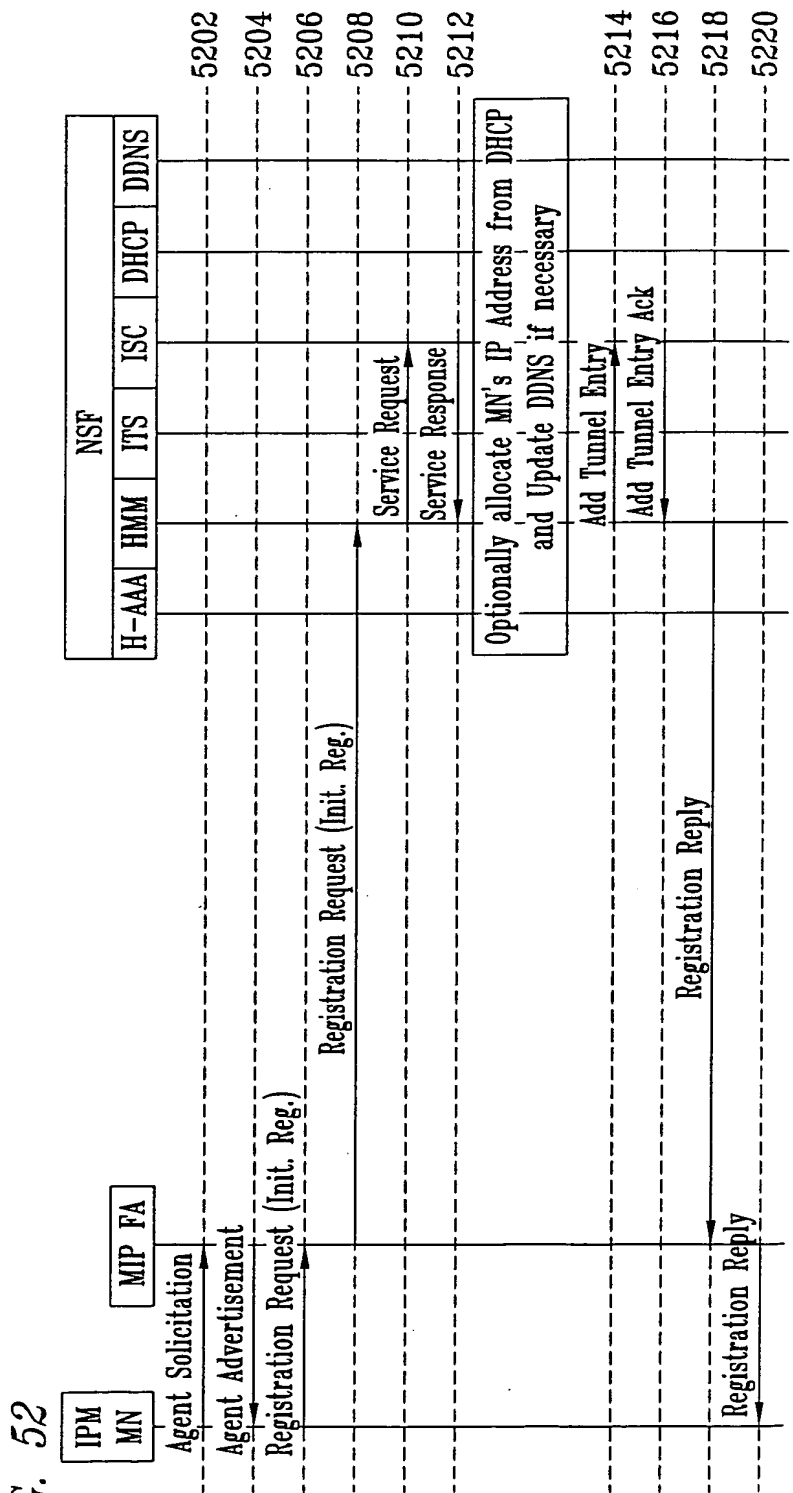

IPM
MN
NSF
ANIF
ITSF
ANIH
ITSH
H-AAA
HMM
ISC
DHCP
Registration Request (ANI Change)
Registration Request (ANI Change)
Service Request
Service Response
Delete Tunnel Entry
Delete Tunnel Exit
Delete Tunnel Entry Ack
Delete Tunnel Exit Ack
Registration Reply
Registration Reply
5102
5104
5106
5108
5110
5112
5114
5116
5118
5120

FIG. 51

FIG. 52


IPM MN
MIP FA
NSF
H-AAA
HMM
ITS
ISC
DHCP
DDNS
Agent Solicitation
Agent Advertisement
Registration Request (Init. Reg.)
Registration Request (Init. Reg.)
Service Request
Service Response
Optionally allocate MN's IP Address from DHCP and Update DDNS if necessary
Add Tunnel Entry
Add Tunnel Entry Ack
Registration Reply
Registration Reply
5202
5204
5206
5208
5210
5212
5214
5216
5218
5220

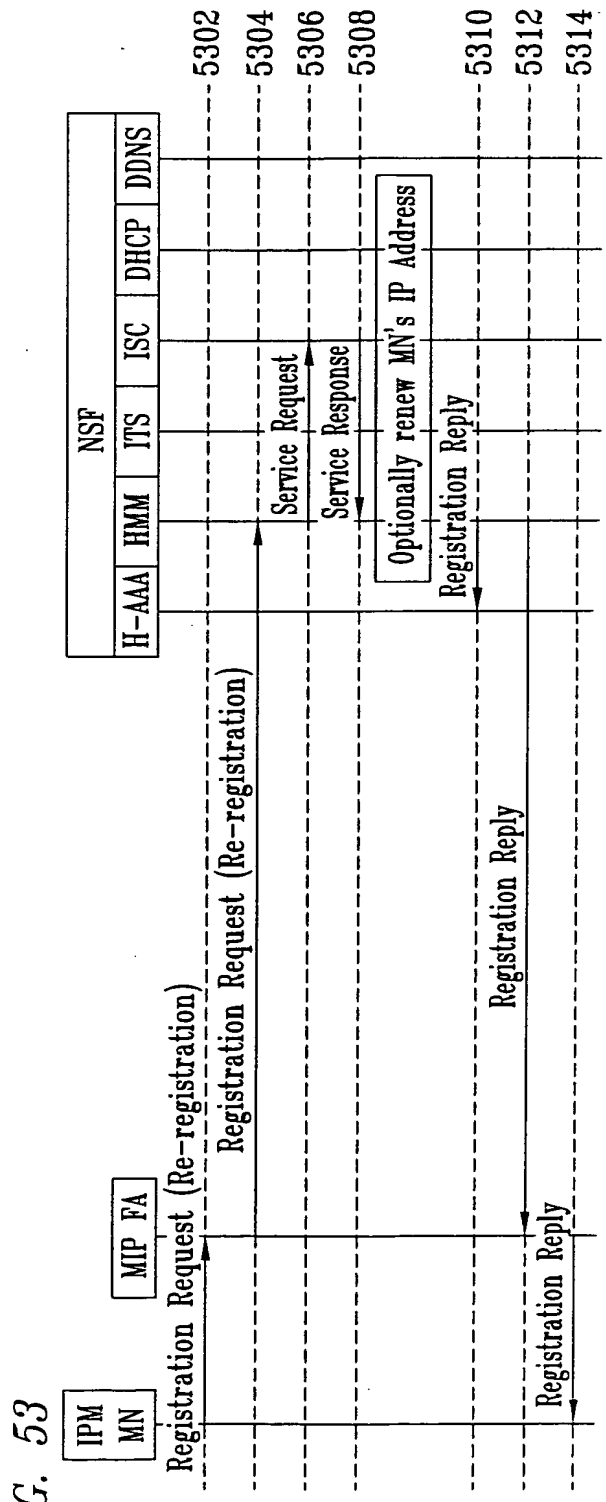

IPM MN
MIP FA
NSF
H-AAA
HMM
ITS
ISC
DHCP
DDNS
Registration Request (Re-registration)
Registration Request (Re-registration)
Service Request
Service Response
Optionally renew MN's IP Address
Registration Reply
Registration Reply
Registration Reply
5302
5304
5306
5308
5310
5312
5314

FIG. 53

FIG. 54

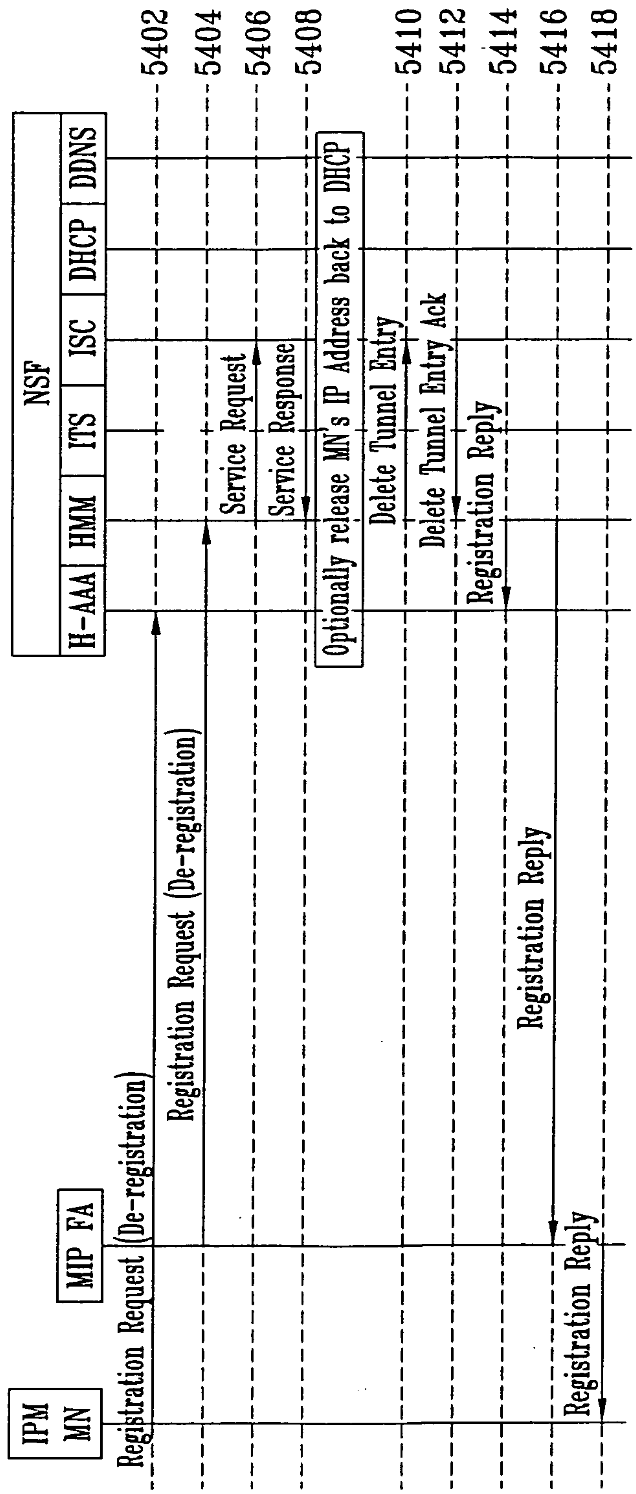
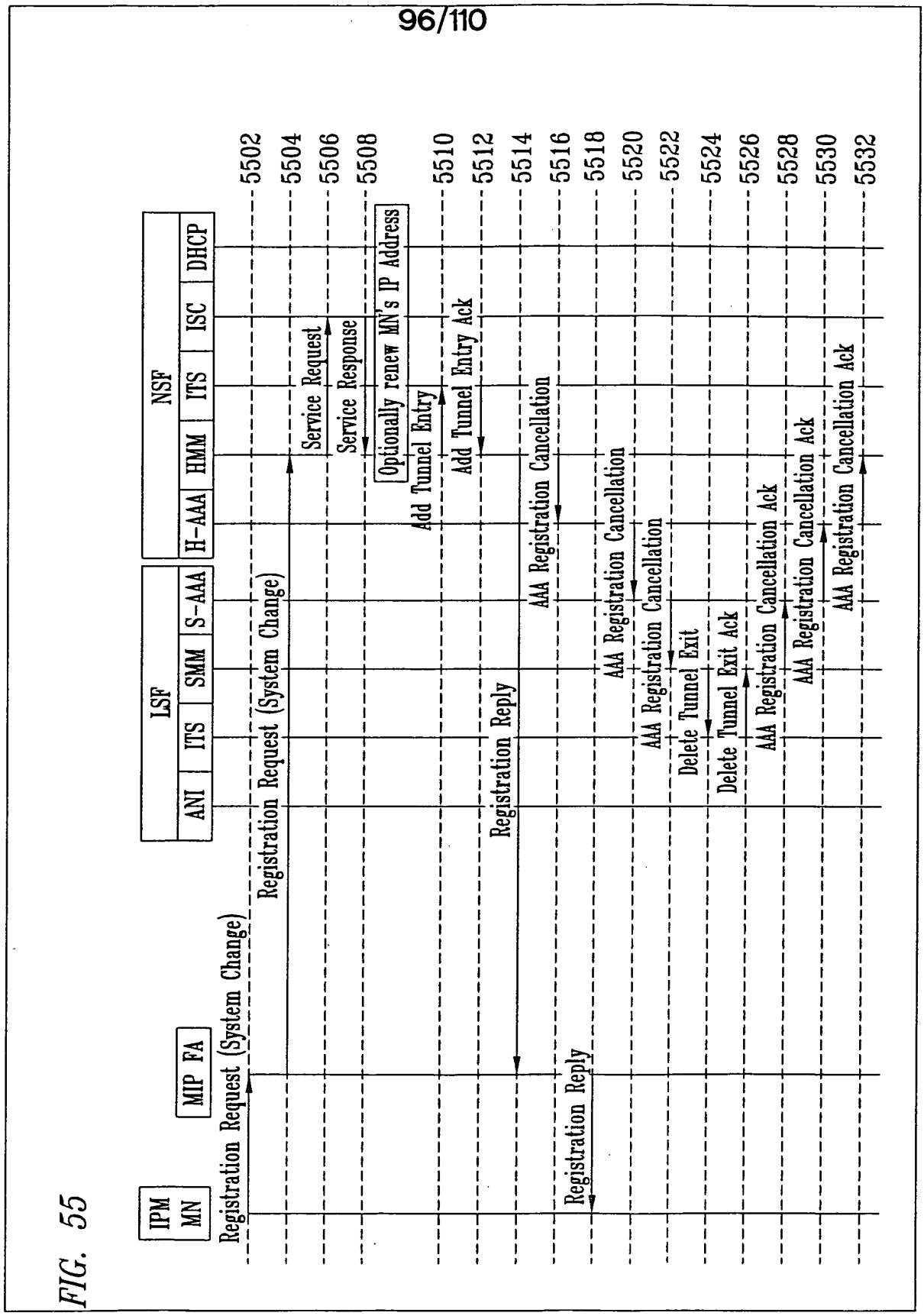

IPM MN
MIP FA
NSF
H-AAA
HMM
ITS
ISC
DHCP
DDNS
Registration Request (De-registration)
Registration Request (De-registration)
Service Request
Service Response
Optionally release MN's IP Address back to DHCP
Delete Tunnel Entry
Delete Tunnel Entry Ack
Registration Reply
Registration Reply
Registration Reply
5402
5404
5406
5408
5410
5412
5414
5416
5418

FIG. 55


IPM MN
MIP FA
LSF
ANI
ITS
SMM
S-AAA
NSF
H-AAA
HMM
ITS
ISC
DHCP
Registration Request (System Change)
Registration Request (System Change)
Service Request
Service Response
Optionally renew MN's IP Address
Add Tunnel Entry
Add Tunnel Entry Ack
Registration Reply
AAA Registration Cancellation
Registration Reply
AAA Registration Cancellation
AAA Registration Cancellation
Delete Tunnel Exit
Delete Tunnel Exit Ack
AAA Registration Cancellation Ack
AAA Registration Cancellation Ack
AAA Registration Cancellation Ack
5502
5504
5506
5508
5510
5512
5514
5516
5518
5520
5522
5524
5526
5528
5530
5532

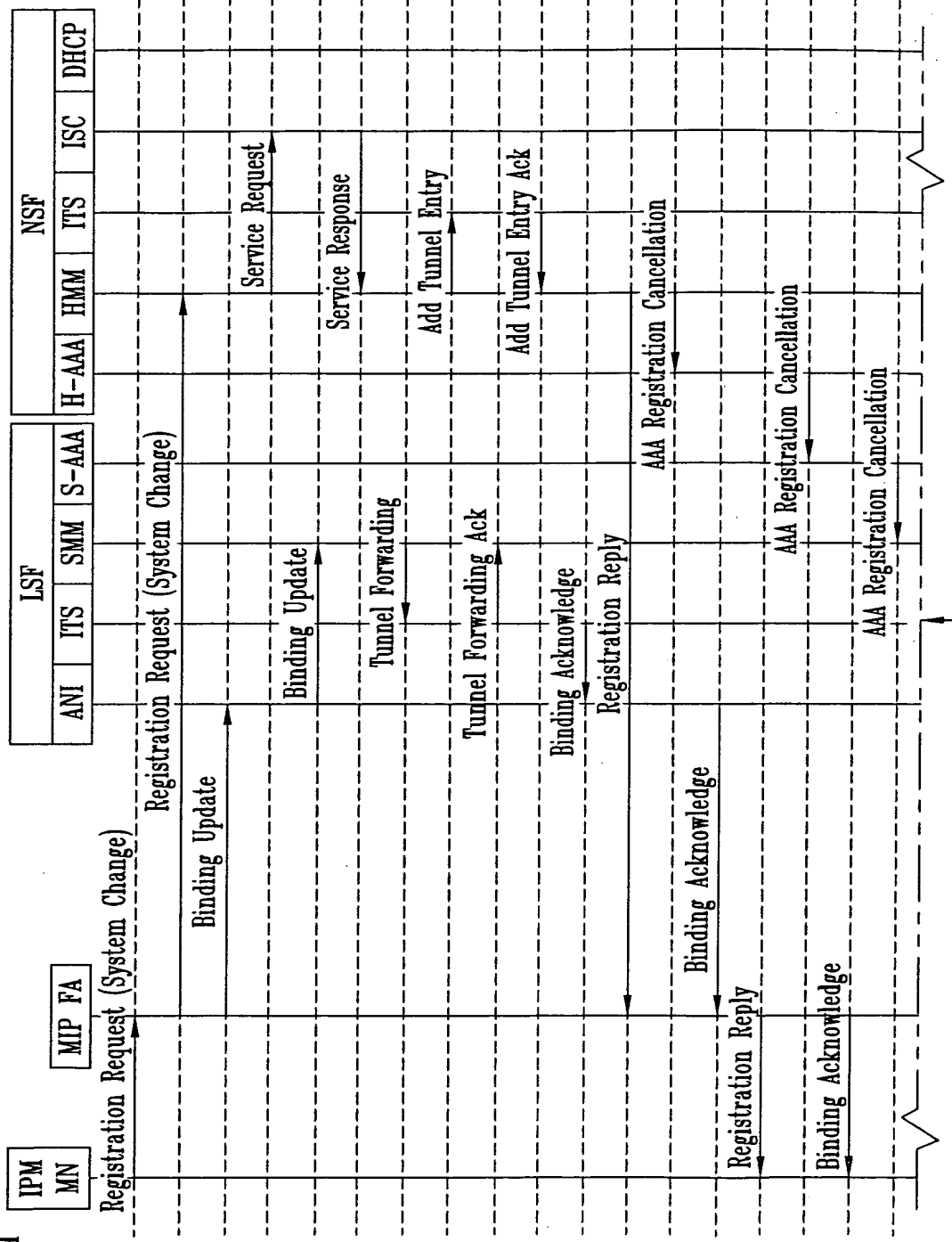

IPM MN
MIP FA
LSF
ANI
ITS
SMM
S-AAA
NSF
H-AAA
HMM
ITS
ISC
DHCP
5602
5604
5606
5608
5609
5610
5612
5614
5616
5618
5620
5622
5624
5626
5628
5630
5632
5634
Registration Request (System Change)
Registration Request (System Change)
Binding Update
Service Request
Binding Update
Service Response
Tunnel Forwarding
Add Tunnel Entry
Tunnel Forwarding Ack
Add Tunnel Entry Ack
Binding Acknowledge
Registration Reply
AAA Registration Cancellation
Binding Acknowledge
Registration Reply
AAA Registration Cancellation
Binding Acknowledge
AAA Registration Cancellation
W

FIG. 56A

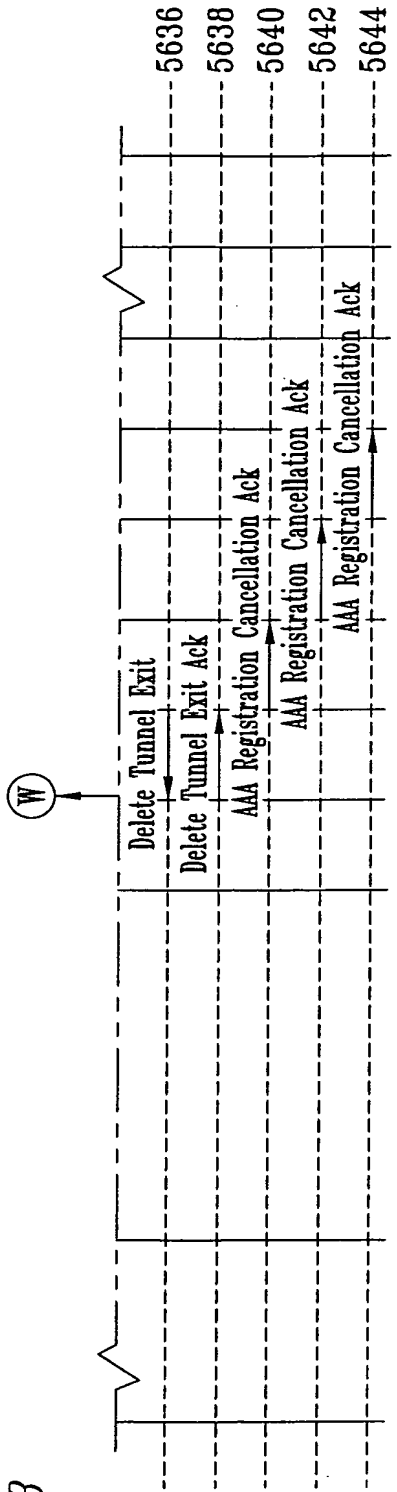

5636
5638
5640
5642
5644
W
Delete Tunnel Exit
Delete Tunnel Exit Ack
AAA Registration Cancellation Ack
AAA Registration Cancellation Ack
AAA Registration Cancellation Ack

FIG. 56B

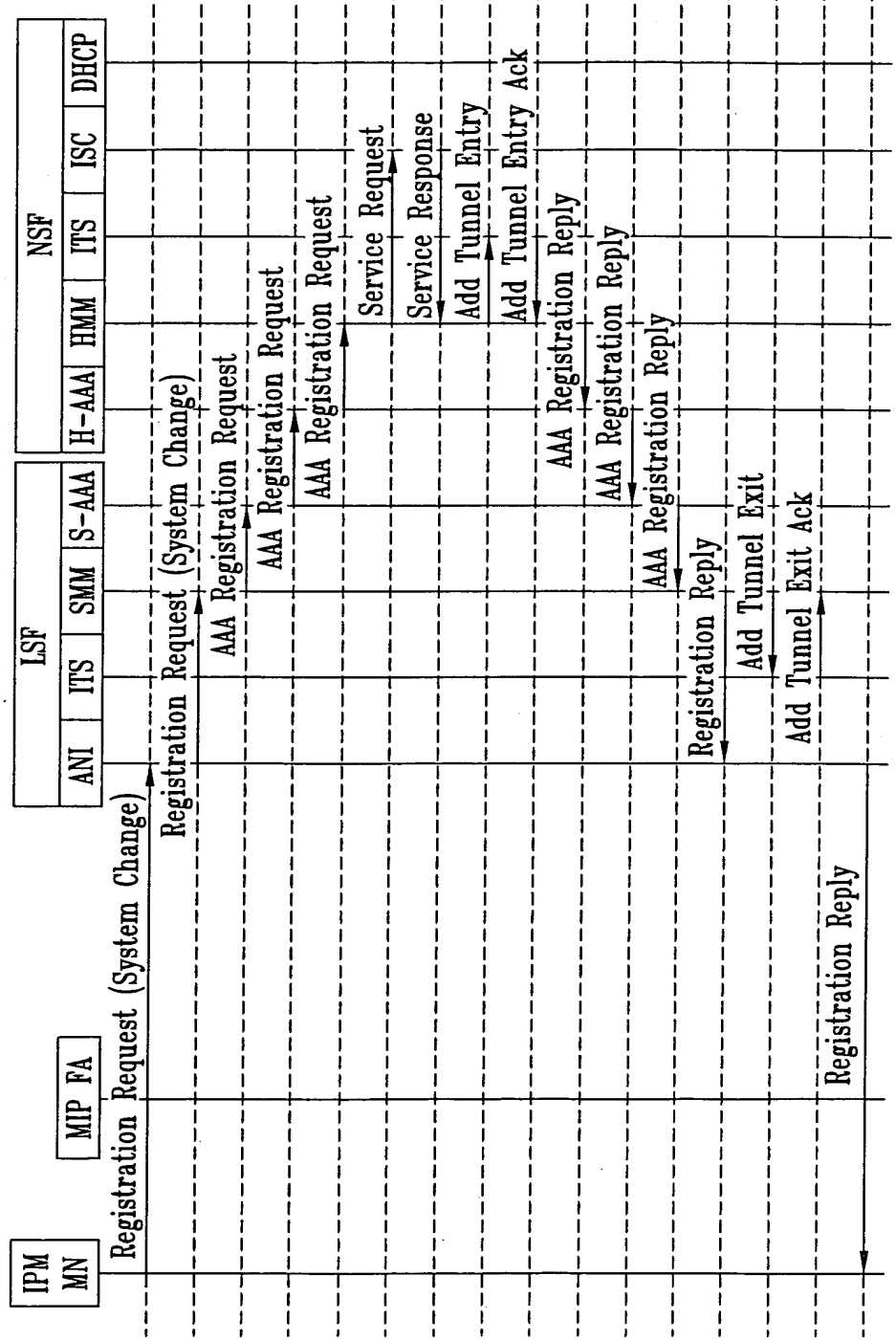

IPM MN
MIP FA
LSF
ANI
ITS
SMM
S-AAA
NSF
H-AAA
HMM
ITS
ISC
DHCP
Registration Request (System Change)
Registration Request (System Change)
AAA Registration Request
AAA Registration Request
AAA Registration Request
Service Request
Service Response
Add Tunnel Entry
Add Tunnel Entry Ack
AAA Registration Reply
AAA Registration Reply
AAA Registration Reply
Registration Reply
Add Tunnel Exit
Add Tunnel Exit Ack
Registration Reply
5702
5704
5706
5708
5710
5712
5714
5716
5718
5720
5722
5724
5726
5728
5730
5732

FIG. 57

FIG. 58